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ABSTRACT

Based on initial planning by the California Commission for Teacher Preparation and Licensing and extensive discussions by teachers, teacher educators, researchers, and representatives of educational organizations in California, National Education Program Associates developed a design for the second Phase of a multi-year research effort, the Beginning Teacher Evaluation Study. The research design involves the collection of pretest and posttest data on student achievement in reading and mathematics from a sample of students in grades two and five in California public schools. In addition, data will be collected about teacher and student background and characteristics, school and district characteristics, and the teaching behaviors of the teachers within the sample. The analysis of data was planned to focus on the identification of teacher behaviors which contribute to student academic performance. Additional goals of the data analyses include the determination of the influence of various background characteristics upon teacher behaviors and upon student achievement. (Author/RC)

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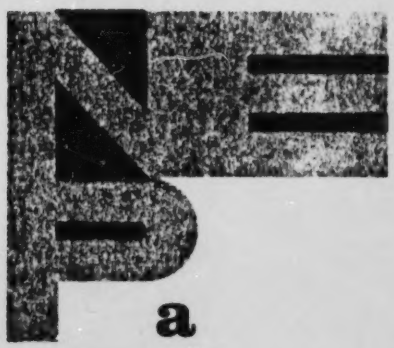
BEGINNING TEACHER EVALUATION STUDY

RESEARCH DESIGN
for
Phase 2

California Commission
for
Teacher Preparation and Licensing
May 15, 1973

Prepared by:



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1 May 1973

Dr. George Gustafson
Executive Secretary
Commission for Teacher Preparation
and Licensing
1020 O Street, Room 222
Sacramento, California 95814

Dear Dr. Gustafson:

National Education Program Associates is pleased to submit to the Commission for Teacher Preparation and Licensing this Research Design for Phase II of the Beginning Teacher Evaluation Study in compliance with and pursuant to the terms of the contract for the preparation of the Research Design.

The Research Design was prepared under the supervision of Dr. Edward A. Welling, Jr., President, N.E.P.A. The Technical Design was written by Dr. Marjorie E. Powell. The task analysis, time lines and budget were prepared by Gerald M. Campbell, Vice President. Research was completed by Ruth A. Richels and Ingrid J. Swanson. Final report preparation was directed by Angela Teresi, assisted by Eleanor Dusombre and Dorothy Lucas.

Consultants in the development of the Research Design were Dr. James F. Baker, Massachusetts Department of Education; Dr. Walter Borg, Utah State College; Dr. Robert Bush, Stanford University; Dr. James Connor, C/U Associates; Dr. Herold C. Hunt, Harvard University; Dr. Haig Marderosian, Emerson College; Dr. Albert Mayrhoffer, University of South Carolina; Dr. Nicholas Silvaroli, University of Arizona.

Transmittal of this Design provides me with an opportunity to personally thank John Cimolino, Commission Chairman, Marcella T. Johnson, Commission Vice Chairman, J. Stanley Green, Committee Chairman, and all members of the Commission who encouraged us in our efforts to produce a design responsive to the needs of the Commission while retaining a sound technical research base. Corporately N.E.P.A. realizes that the time alloted to complete the listed tasks is tight. In an era of increasing economic pressure to produce tangible and applicable programs as rapidly as possible it will be essential that such a schedule be maintained in order to meet the overall schedule for completion of all phases of the study.

The Office Of Economic Opportunity (which funded the Commission to complete this phase of the study) gave invaluable assistance during the preparation of the Design. Mrs. Viginia Koehler and her staff displayed patience with and provided advice and counsel to N.E.P.A. during the design preparation.

Finally, the enthusiasm and encouragement displayed by you and members of your staff made this task enjoyable as well as challenging.

Good luck in completing what should be a most significant effort in the area of teacher licensing.

Sincerely,

Edward A. Welling

Edward A. Welling
President

Commission

for

Teacher Preparation and Licensing

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*Staten W. Webster, Representative
The Regents of the University of California

* Members of the sub-committee directly responsible for the Beginning Teacher Evaluation Study

** Committee Chairman

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I INTRODUCTION

There has been a great deal of national research over the past 15 years about the effect of a wide array of school service variables and their relationship to improved pupil performance.[1]

The results of the research indicate that teachers have the greatest impact of all the school service variables. This mounting evidence about the importance of teachers as the key variable undoubtedly contributed to the eventual development and enactment of two laws by the California State Legislature during the last two years. California is the only state, thus far, to have passed effective legislation placing decisions on teacher education and licensure in the teaching profession and higher education.[2] In addition, California also enacted a law requiring the evaluation and assessment of the performance of certificated employees.[3] These laws provide a unique opportunity and impetus for California's development of clearly defined entry level standards for beginning teacher performance; and for the continuing evaluation and assessment of the performance of certified employees throughout their professional career.

The two laws require the establishment of certain standards for both new and experienced teachers in order to construct a firm basis for accountability. Before accountability can be effectively accomplished, it is clear to the Commission for Teacher Preparation and Licensing that further research in the teaching evaluation area is necessary in order to establish baseline entry skill data for beginning teachers. The identified skills judged necessary for successful teaching can then be used to help improve the quality of teacher preparation. Moreover, once entry level skills to the profession have been established, the restructuring of requirements for specialist instruction (advanced preparation) credentials, and the consideration of the skill expectations of an array of sub-professional classroom positions, becomes more feasible.

Currently the State licenses teachers based on their completion of a set of college courses and experiences, and practical experience called student teaching. There is, however, a growing interest in attempting to reduce the substantial "inferential leap" that exists when one assumes that a collection of coursework capped off by a practicum will nearly always

produce a person ready to be licensed as a teacher.

It is, therefore, proposed that a baseline list of entry level skills be developed. This would take a great deal of the "guess work" out of currently existing teacher preparation programs. For example, if a teacher candidate is able to diagnose a child's reading problem and this act is observed and recorded by a college supervisor or a school district cooperating teacher, then one can be reasonably certain that the candidate understands the process of diagnosis. The normal requirement of certifying "knowledge" about reading diagnosis via a paper-and-pencil test in the college classroom has thus been supplemented by an actual or simulated performance by the candidate, and one can safely say the "inferential leap" about the candidate's ability to diagnose a reading problem has been substantially reduced.

II PROBLEM

The purpose of this research is to isolate those teacher competencies which contribute the most to elementary pupils' cognitive and affective achievements in reading and mathematics. To this end the study will focus on the relationship between teacher competencies and student achievement. Within this broad structure, a more detailed design has been developed, taking into account the wishes and preferences of the members of the Commission for Teacher Preparation and Licensing, the Commission mandate, the concerns of the several consultants to the Commission as expressed in the Design Conference.

The following design is an outgrowth of all the previous thought and work of the Commission members and the consultants to the commission.

In order to focus upon the relationship between student achievement and teacher competencies, the study will include a sample of teachers and the students who are assigned to those teachers during the school year. In Phase II, the 1973-74 school year, this sample will include 144 elementary school teachers, grades 2 and 5, who have had experience within the public schools of

the state of California. During Phase III, the 1974-75 school year, the sample of teachers will be expanded to include both experienced and beginning teachers.

Many variables have an impact upon student achievement, as reported within the literature concerning student achievement. For the study to focus upon teacher competencies, the influence of other variables must either be controlled or taken into account within the statistical analyses. Since control of other variables is very difficult within social research, they will instead be included as measured variables within the study. In this manner, their impact upon student achievement can also be considered. All of the variables to be included can be classified into five major categories: student achievement, the dependent variable, student background variables, teacher competencies, teacher background variables, and school and school district variables. An initial identification of variables has been completed as part of this design based on an analysis of the literature. A more detailed presentation of the variables can be found in the section dealing with variables.

III POTENTIAL VALUE OF THE STUDY

As the study identifies those teacher competencies which have an impact upon student achievement, the potential value of the study will be:

(1) To stimulate modification of teacher preparation programs by emphasizing the improvement of teacher competence;

(2) To develop better standards for the licensure of teachers;

(3) To contribute to the development of sound bases for evaluation and assessment of the performance of beginning certificated teaching personnel;

(4) To use the above to define more clearly baseline entry level skills for:

(a) beginning teacher performance

(b) specialist teacher performance (baseline plus)

(c) sub-professional (career ladder) performance (baseline minus)

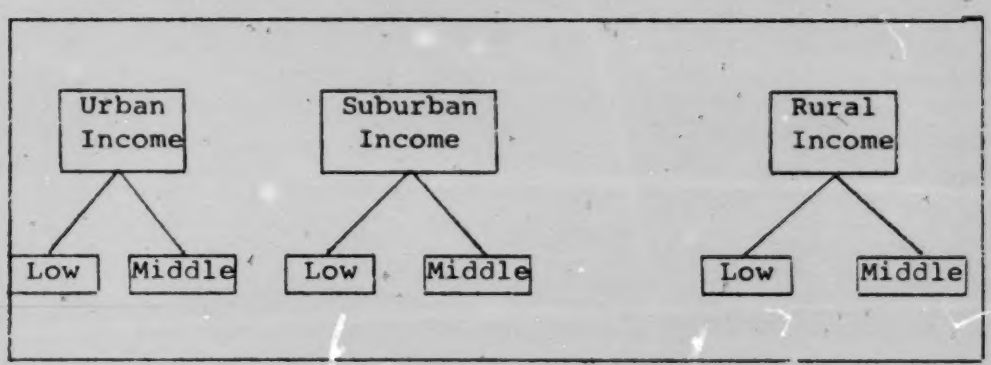
(d) evaluation and assessment of the performance of experienced certified employees throughout their careers.

IV SAMPLE

During Phase II the study will focus upon 144 experienced teachers. These teachers will be identified through a procedure of sampling schools based on the population and income characteristics of the schools.

To facilitate the conduct of the study, logistically--feasible population areas will be identified in the three population categories of urban, suburban, and rural. Schools within these three population areas will then be classified into schools serving low and middle income students. This determination will be made on the basis of the 1970 census data. A sample of schools will then be randomly selected within each income category within each population category.

DIAGRAM I



Teachers

Within the sample schools, all experienced teachers in grades 2 and 5 will be identified. For purposes of this study, "experienced teacher" will be defined as any teacher who has taught for two or more years within the public schools of the state of California. For inclusion in the study both years of experience must have been in the school in which the teacher is teaching currently. Every effort will be made to involve teachers with 5 or more years of teaching experience, the last two of which must have been in the school in which they are currently teaching.

Teachers will be excluded from the study for one or both of the following reasons:

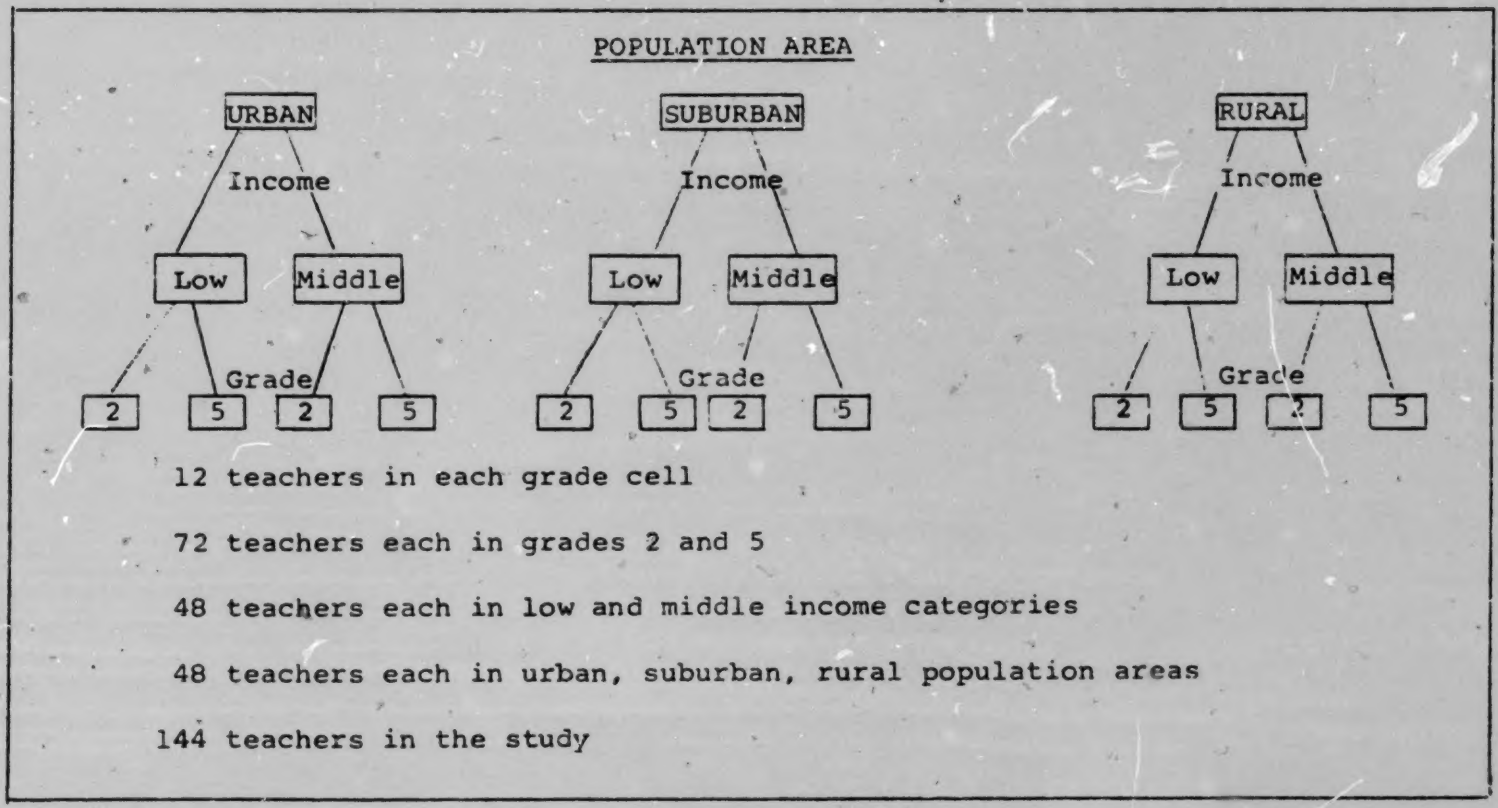
1. the presence in the classroom of another teacher of reading or mathematics,
2. the presence of instructional aides.

Thus, teachers included in the study will be those who teach reading and mathematics without the use of instructional aides.

The teachers will be stratified by the population income classifications into which their schools fall and by grade level. A random sample will be selected

from the teachers within each of the strata. An equal number of teachers will be selected for each strata. Once the original sample has been identified, a second random listing will be made of the remaining teachers in each strata. This list will form the basis for selection of additional teachers to fill the places of teachers selected for inclusion in the original random sample who choose not to participate in the study. Diagram II presents the stratification procedure visually.

DIAGRAM II


POPULATION AREA
URBAN
Income
Low
Middle
Grade
2
5
2
5
SUBURBAN
Income
Low
Middle
Grade
2
5
2
5
RURAL
Income
Low
Middle
Grade
2
5
2
5
12 teachers in each grade cell
72 teachers each in grades 2 and 5
48 teachers each in low and middle income categories
48 teachers each in urban, suburban, rural population areas
144 teachers in the study

Teacher Cooperation*

To maximize assurance of adequate teacher cooperation, teachers will be oriented concerning the purposes and procedures of the study and will then be asked to participate. Involvement in the study will require time and attention of the teacher. To enable teachers to provide the extensive cooperation needed, while fulfilling their major responsibility to their students, a series of arrangements will be made to provide assistance to teachers.

Teachers will be assured of the confidentiality of all data collected during the course of study. Information will be compiled and reported for total groups of teachers and students. No individual student, teacher, school, or school district, will be identified

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*The provision for a variety of supports to the teachers involved in the study is an addition to the original design of the study. The cost of such support is also an addition to the cost of the study, since it was not included in the proposed study budget. An additional allocation will be necessary for this added aspect of the design.

either during, or as a result of, the study.

An honorarium will be paid, at the end of Phase II, to all teachers who participate in the study. The honorarium is intended to indicate the importance of teachers within the total study, and the sense of appreciation for their efforts for the success of the study.

An equally vital support to the teachers during the course of the school year will be the provision of substitutes for days that the teachers will be out of the classroom for purposes of officially assisting in the study. These "out-of-classroom" days may be necessary to train teachers in the administration of specified measuring instruments to students, to interview teachers for the purpose of collecting information for the study, to review and field test instruments which may be developed during Phase II.

To assure the on-going work within classrooms, teachers require time to plan adequately for the instructional program provided to students.

Since teachers will be out of the classroom for a day at a time, they will need additional planning time to provide adequately for instruction while they are

out of and as they return to the classroom. Therefore, a substitute will be provided to each teacher on the day after the teacher is out of the classroom to cooperate with the study. This additional substitute assistance will be provided to assure the teacher sufficient planning time. Substitutes will be secured through the regular procedures of participating local school districts. Payment for substitutes will come from monies allocated to Phase II of the study.

The study will provide direct assistance and feed-back to all teachers and administrators who participate in the research. As one step to fulfill this commitment, the Phase II plans include provision for video-taping all teachers for one half hour at a time stipulated by the teacher. This video-tape will be for the use of the teacher, not for purposes of the research, and will be made available to the teacher after the final post-test data have been collected. Specific suggestions will be made to the teachers regarding ways in which they may use the tape to analyze their teaching techniques, student reactions. Teachers will thus have an opportunity to observe themselves in a teaching situation and to use the video-

tape as a micro-teaching tool.

The procedure of allowing teachers to opt-out of the study will result in a self selected group of teachers and thereby alter somewhat the results of the study. However, the alternative of retaining uncooperative teachers in the study would have more confounding effects upon the study since a lack of cooperation can be expressed in many ways, some of which may not be recognized or taken into account in the interpretation of the statistical results. Further, the Commission will retain the right to request teachers to withdraw from the study. Specifically, should the study appear to be affecting students negatively in a participating teacher's classroom such teacher could be requested to withdraw from the study. The design integrity can be retained with as few as 120 teachers completing Phase II.

Students

The sample of students will be composed of the students who are assigned to the teachers in the sample. With 144 teachers included at the start of the study, the sample of students will include approximately 3600 students, assuming 25 students per teacher. This

number will be divided approximately evenly between grades 2 and 5.

V VARIABLES

The variables to be assessed within the study will fall into five major categories which are detailed below.

Student - Background

Student background variables have been shown in a number of studies to be related to student achievement. The specific variables may be modified by the Commission or the contractor during the initial steps of Phase II, based on a detailed literature review. However, a tentative list of variables is presented in Appendix A.

Data will be compiled from school records. Additional information will be obtained from census track data available from the 1970 Federal census. Instrument development procedures are described in another section of this design.

Student - Achievement

Student achievement is the dependent variable of the study. To assess adequately student achievement,

two major areas of basic skills within the elementary school program will be considered: reading and mathematics.

Student achievement will be measured by standardized norm-referenced and by criterion-referenced tests. The measures of student cognitive growth will focus on decoding and comprehension skills in reading and conceptual understanding and computational skill in arithmetic. Measures of application of skills will involve the students in problems requiring the application of reading and arithmetic skills. Student attitude toward the subject area will be assessed by a self-report instrument. A measure of student learning styles will provide an indication of the manner in which students acquire information. A listing of the student achievement variables is presented in Appendix A.

Mathematics has been included for three reasons. 1) The skills which are involved in teaching reading may be different from the teacher-skills involved in teaching other subjects, such as mathematics. 2) The increased effort and expense involved in the collection of information concerning mathematics achievement will

be minimal compared with the increase in information available to the study. 3) The possibilities of data analysis are greatly expanded with the addition of the second subject area. The analysis includes a. the comparison of student achievement in reading with student achievement in mathematics; b. the teacher skills associated with achievement in reading; c. the teacher skills associated with achievement in mathematics; d. comparison of the teacher skills associated with achievement in reading with those associated with achievement in mathematics.

Teacher-Background

A variety of teacher background variables will be included within the study. These data will be compiled from teachers and from school records, on a form, which will include demographic variables such as years of teaching experience, and variables dealing with professional training, such as types of in-service training completed. A tentative listing of teacher background variables is presented in Appendix A.

Teacher Behaviors

Teacher behaviors will include several variables relating to the teaching skills and classroom behaviors

of teachers. A variety of techniques will be used to measure the behaviors:

(1) tests of knowledge,

(2) measures of attitude,

(3) observational procedures designed to classify and record the behavior of the teachers.

Data collection procedures and assessment instruments will be selected from available instruments or developed to meet the needs of the study. Instrument development procedures are described in another section of the design.

Several areas of teacher behavior will be studied to determine those behaviors which are related to student achievement. Past research has identified teacher verbal ability as a variable related to student achievement. Teacher verbal ability will therefore be included, along with teacher quantitative ability, in light of the inclusion of student cognitive achievement, application of skills, and attitude toward the subject area, in arithmetic.

Communication between teachers and students will be assessed, including teacher concern for the

communication environment, characteristics of teacher communication, and student response to the characteristics of the teacher communication. Teacher response to and utilization of student communication will also be an area of concern.

The process of diagnosing student skills and learning needs will be an area of investigation. However, since diagnosis is only the first step, the second step, the process of developing instructional plans or prescriptions based on diagnosis will also be examined.

Teacher knowledge of the teaching areas, reading and arithmetic, in terms of procedures for instruction and heirarchies of learned skills, skills which are prerequisite to learning other skills, will also be assessed. Teacher attitude toward the subject area, and the teaching of the subject, will be included for reading and arithmetic.

School and District - Background

A variety of school and district variables will be included within the study, since they may have an impact upon student achievement either separate from or in interaction with teacher variables. While the

study is focusing upon teacher behavior, teachers do not function in a vacuum, but within a school and a school district. These data will be compiled at the start of the school year and up-dated as necessary during the school year. It must be recognized that the study may have an impact upon the schools and school districts in which it is being conducted. It is not possible to avoid this impact, but it is possible to track many of the effects and thereby take them into account in the data analysis and interpretation. To provide this information, school and district data will be up-dated throughout Phase II.

VI INSTRUMENT SELECTION DEVELOPMENT

Existing instruments will be reviewed to determine the degree to which they meet the data needs of the study. Appropriate instruments will be selected for inclusion within the study whenever they are available. In the event that instruments are not available, or require revision before meeting the needs of the study, instruments will be developed or modified within Phase II of the study.

The general format of the instruments will be

determined along with the types of items to compose the instruments. Draft instruments will then be developed. A committee will be selected, composed of individuals and representatives of groups, to review the draft instruments. This review will provide an opportunity to identify and solve any major problems associated with the draft instruments.

A field test will be conducted for all instruments which are developed or modified within Phase II. A sample size will be determined for each field test, along with a procedure for selecting the sample. The sample will be selected and the teachers trained in administration of the instrument and observation of the administration to record any events which might have an impact upon the instrument. The instrument will be revised based on the administration and observation of the administration of the instrument.

An item analysis will be conducted for the instruments for which such a procedure is suitable based on the data obtained from the field test. The item analysis will provide information to identify items which should be dropped from the instrument, identify items which require revision of the alternative

responses, and identify items which require revision of the difficulty level. Item modifications will be made as necessary based on the item analysis.

Procedures will be determined for conducting a reliability study for the instruments developed or modified during Phase II. The variety of procedures for computing reliability will be reviewed and an appropriate procedure selected. Samples will be selected, administrators will be trained, and instruments will be administered. Instrument reliabilities will then be computed.

VII DATA COLLECTION

Data will be collected by a variety of methods, depending upon the data to be collected. The instruments will include self report inventories, norm and criterion referenced tests, attitude measures, demographic data forms, and interview and observation procedures. Details of the data collection methods are presented with variables, in Appendix A, along with the instruments which are recommended. The instruments to be used will be selected from those available whenever possible. When no appropriate

instruments are available, instruments will be developed, reviewed, field tested and revised as necessary to meet the data collection needs of the study. When observation procedures are utilized, a team of observers will be trained to conduct the observation.

Schedule

Measures of student cognitive growth, application of skills, and attitude toward reading and mathematics, will be administered on a pre-post basis, in late September and early June. In this manner the study will have measures of both entry level skills and achievement at the end of the school year.

All student measures of cognitive skills, application of skills, and attitude, will be administered by the teachers to their own students. Prior to instrument administration, all teachers will be trained in the procedures for administering the instruments. A master schedule of student assessment will be prepared, and all teachers will administer the student instruments at the time and date established for administration.

No attempt will be made to obtain make-up

information from students who were absent on the day of administration of a particular instrument. Such make-up testing would result in a major disruption of the educational program of the schools. Procedures for assuring consistency of instrument administration during such make-up testing are not feasible within the constraints of the study. The size of the student sample is very large and will allow for the loss of some student through absence from any measurement of achievement, application, or attitude.

A procedure has been developed to assure the consistent administration of all student measures. A group of 14 observers will be trained, with the teachers, in the procedures for instrument administration. These persons will observe within classrooms on a schedule such that they observe a different classroom each day of the administration of the student instruments. This will provide for assurance of consistency of administration in 14 different classrooms during each day of instrument administration. A random assignment of observers to classrooms will assure that inferences can be made to all classrooms from those classrooms actually observed.

Teacher data will be collected at the start of the school year, including the background data and the measures which are to be completed by each teacher. This information will provide an indication of the skills and abilities of the teacher at the start of the school year.

School and district information will be compiled at the same time to provide baseline information. However, some of the school and district information will need to be collected throughout the course of the school year. This is true because some of the information may not be available at the start of the school year, and some of the information may change during the school year. The study itself may have an impact upon some of the school and district data, and that impact will need to be measured.

Classroom Observations

Observations of the classrooms of the teachers in the study will be made during the second half of the school year, February and March. This scheduling will allow the observations to be conducted during one stretch of time uninterrupted by major holidays or other breaks in the school routine.

It will further allow for the development, field test and revision of observation instruments if that is necessary, and for the training of observers in the use of the instruments.

The observations will be made in several ways. Trained observers will spend time in each classroom, observing the on-going functioning of a variety of specific variables within the classroom. The observations will be scheduled during the reading and arithmetic instruction. The classrooms will also be video-taped during two half hour time periods to provide a recorded sample of classroom observations for further, more detailed, analysis outside of the classroom. In order to assure some video-taping of classroom interaction, not simply the taping of the teacher administering a test, the video-taping will be divided into two half hour sessions. One session will be during a half hour which the teacher selects, at a day and time of the teacher's preference. However, due to the scheduling difficulties, a time period will be identified during which each teacher will be given a time period within which they must identify a day and time for video-

taping. The second session will be at a time randomly selected by the following procedure. To eliminate video-taping at an unsuitable time, the daily schedule will be obtained for each teacher, and the unsuitable times identified. These times will be removed from the population of possible video-taping times, and from the remaining times, a half hour will be selected at random. This method will avoid some, but not all, of the problems of video-taping at a set time, when the class may be engaged in an activity which does not provide teacher behavior or class interaction of the type desired for observation.

The video-taping will be of the reading instruction within the classroom, to provide for an in-depth analysis of teacher behavior in the teaching of reading.

In addition to video-taping, audio taping will be conducted in each classroom. Teachers will be provided with the necessary equipment and requested to record two half hours of class time, one during reading and one during mathematics instruction. These tapes will be analyzed to provide data for the determination of teacher behaviors which occur within the sample classrooms.

Consistency Sample

The schedule of observations at one point during the school year is based on the assumption that the behavior of experienced teachers does not change during the school year. To test this assumption, a 10% sample of teachers will be selected from the total group of teachers in the study. Video tapes will be made of this 10% consistency sample of teachers at three points during the school year: the start, middle and end. Thus, the fourteen teachers will be video taped for two half hour periods, one of their choosing and one selected at random from the suitable times of the day, in October, February, and May.

Trained observers will observe these video tapes and record observations of a variety of teacher behaviors, without information concerning the time of the school year at which tapes were made. The observing of the tapes will be done in June, after all of the taping is completed. The ratings of the tapes will be tested for consistency of teacher behavior over the course of the school year by correlation of the observations for the three times of the year.

Teacher Video-Tape

After the taping of each classroom for study purposes an additional video tape will be made to provide each teacher with a video tape of the teacher and the classroom. These video tapes will be made available to the teachers, after the post-testing of the students has been completed, in order that teachers may observe their own classrooms, their instructional procedures and teaching behaviors. Specific suggestions will be made to teachers regarding the manner in which they may use the video tape.

All data will be analyzed within Phase II. Data analysis procedures are presented in the next section. Decisions will be made concerning the Phase II, based on these analyses. Promising variables will be identified to be studied in greater depth in Phase III. Data collection instruments and procedures will be reviewed to determine those to be retained in Phase III. Procedures will be developed for selecting samples of teachers for Phase III.

VIII DATA ANALYSIS

Data Analysis for Instrument Development

For any instruments developed during Phase II standard procedures for instrument development will be conducted. An item analysis will provide data to determine the items which should be included within the finalized instrument and the items which should be revised. Instrument reliability will also be computed.

Descriptive Statistics

For the dependent and independent variables descriptive statistics, mean and standard deviation, will be computed and reported. A sample of the format for reporting the descriptive statistics is presented in Appendix B.

Dependent Variables

For each subject area the relationships among the different measures of the dependent variables will be considered. The relationship among the measures across subject areas will also be analyzed. This analysis will attempt to answer such questions as: What is the relationship between attitude toward reading and attitude toward mathematics?

Correlation coefficients will be computed to measure the degree of relationship among the measures of the dependent variable, student achievement. The correlation coefficients will be presented within a correlation matrix, a sample of which is presented in Appendix B. A two-tailed test of the significance of the correlations (significantly different from zero) will be computed. The two-tailed test of statistical significance will be used because the specific direction of the relationship, positive or negative, has not been hypothesized.

A scatter plot of the correlations will be prepared and the linearity or curvilinearity of the relationship will be assessed visually. For any relationships which, by visual assessment, appear to be non-linear, a test for linearity will be made.

Independent Variables

The relationship between each of the independent variables and the dependent variables of student achievement will be analyzed. This will allow for the identification of individual variables which may impact upon student achievement as measured by each of the dependent variables. The interrelationship

between all of the independent variables will be studied, to determine whether there are groups of variables which are interrelated. Correlation coefficients will be computed to measure the degree of relationship, and will be presented within a correlation matrix, a sample of which is displayed in Appendix B.

A two-tailed test of the significance of the correlations (significantly different from zero) will be computed. The two-tailed test of statistical significance will be used because the specific direction of the relationship, positive or negative, has not been hypothesized.

A scatter plot of the correlations will be prepared and the linearity or curvilinearity of the relationship will be assessed visually. For any relationships which, by visual assessment, appear to be non-linear, a test for linearity will be made.

An important area of concern within this step of the analysis is the relationship of the variables as revealed by the data, in comparison with the categorizing of variables into five classifications within this design. It may be that there are several

interrelated variables, or several variables which, as defined and measured within this study, are measures of different aspects of the same variable. These interrelationships may differ from the classifications of variables as defined by the design. Thus, the number of books available to students may be a measure of the wealth of the community, or may be a measure of the degree of ESEA Title II monies which have been available to the school district. The analysis of the interrelationships of the variables is a vital step in the interpretation of the results of the study. Correlation coefficients will be computed for all of these analyses of variable relationships.

Partial Correlation

Partial correlations will be computed to determine the impact of some variables when the impact of other variables is removed. Thus, the correlation between pre test and post test scores can be computed when the impact of student academic ability is removed, or partialled out. The relationship between teacher behaviors and student achievement can be determined when the impact of student academic ability has been

partialled out, or removed. These partial correlations, or second-order correlations, will be computed between the dependent variables, the measures of student achievement, and the independent variables, the measures of teacher behavior and teacher, students, and school background variables. The partial correlations will be computed with student academic ability and socioeconomic level partialled out or removed.

Multiple Regression

Multiple regression analysis will be utilized to look first at the relationship of the independent variables to each of the dependent variables. This analysis will indicate those variables which are related to the measures of student achievement, variables which can account for a portion of the variance in student achievement as measured by each of the measures of student achievement. A step-wise multiple regression will be computed.

The regression equation will be stopped at the point where the entry of another variable does not significantly increase the amount of variance of the criterion accounted for by the regression, with a significance level of .05. The variables which

enter the equation, and their associated B and Beta weights, will be presented in a Table, a sample of which can be found in Appendix B.

A second step in the multiple regression analysis will involve the forcing of variables into the regression analysis in differing orders. This will be done to determine the interrelationship of groups of variables, in terms of accounting for portions of the variance in student achievement. This step is necessary because the independent variables may be interrelated. Within a regression analysis, the variable which enters the regression equation first accounts for the larger portion of the variance of the dependent variable. However, the first variable also accounts, within the regression analysis, for that portion of the dependent variable variance which can in reality be attributed to the interrelationship between the two independent variables. For this reason, the amount of variance attributed to a given independent variable is effected by the order in which the variable enters the regression equation. The extent of this overlap of variables in accounting for variance in the dependent variable can be deter-

mined by forcing one variable into the equation ahead of the other, reversing the procedure, and then computing the variance attributable to each separately and to the two jointly. The format for presentation of the results of this analysis is presented in Appendix B.

Cannonical Correlation

The use of the multiple regression analysis will allow for the determination of variables which account for a portion of the variance in each dependent variable separately. However, it is the philosophical position of the study that the dependent variables are all important in terms of the goals of the educational programs of the California public schools. For this reason, it is also necessary to look at all of the dependent variables together, in an attempt to determine the independent variables which impact upon all aspects of student achievement in reading and mathematics. This will be done through the use of the cannonical correlation, which analyzes the relationship between several dependent and several independent variables. The independent variables which in the previous analyses have been shown to

account for a portion of the variance in student achievement will be included within this analysis.

The cannonical correlation will allow for the determination of the independent variables which have the greatest relationship to the totality of student achievement as measured by the dependent variables within the study. The analysis can be done separately for reading and mathematics and for the two subject areas combined.

Achievement and Ability

An analysis will be made of achievement in relation to measured student ability. This will involve the computation of predicted scores, based on the measures of student academic ability, and the comparison of the actual achievement scores with the predicted scores. An alternative approach would be an analysis of variance of growth scores, post test scores, or growth above or below the normative average of the test, between two or more groups of students, with the groups divided on the basis of academic ability.

Factor Analysis

A factor analysis will be conducted of the independent variables. This is a statistical procedure to determine the relationships among the independent variables. Those variables which are most closely correlated cluster together to form factors. The factor analysis will result in a listing of the variables and an indication of the degree to which each variable is related to a given factor, the factor loading. A sample of the format in which this information will be reported is presented in Appendix B. Factor analysis provides a means of determining the variables which are closely related, indicating the presence of factors or clusters of variables. Factor analysis is "a generally useful procedure whenever the task is to determine the minimum number of independent dimensions needed to account for most of the variance in the original set of variables."[5]

Through this analysis, the factors being tapped by the measurement instruments will be identified. Based on this information, the measurement instruments which most clearly measure the factors can be identified. The factor analysis may indicate instruments which are

highly successful, and instruments which are not successful, in assessing the factors which appear in the factor analysis. The instruments may be revised, or some instruments dropped from Phase III, based on the factor analytic results.

IX REPORTING

A technical report will be prepared, based on the data analysis. This report will include a review of study procedures, a review of the data collection instruments, statistical tables of data, narrative discussion of the data, summary and conclusions.

A total of 100 copies of this report will be submitted to the Commission for Teacher Preparation and Licensing. A copy will also be submitted to the ERIC collection for dissemination to the educational community.

A summary report will be prepared, to present the study findings in a format appropriate for general distribution. The report, of approximately 20 pages, will include graphics and will be printed in one color. The Commission will receive 10,000 copies of this report.

An oral presentation will be prepared of the summary findings of the study. The presentation, including, visuals, will be presented to educational agencies and groups throughout California.

X ASSUMPTIONS

The study is based on a series of assumptions about education and schooling. The first of these is that student learning, cognitive achievement, application of skills, and attitude toward the subject matter, are related, in part, to the environment of the school and the behavior of the teachers.

A second assumption is that the educational research methodology, including measurement techniques and statistical procedures, are adequate to locate and display any existing relationship between student achievement and teacher behavior.

It is recognized that the presence of observers and tape equipment, as well as the knowledge, on the part of the students and teachers, that they are part of a study will have an effect upon the instructional program in the classroom. However, the assumption is being made that this effect will not be large enough

to alter drastically the relationship between student achievement and teacher behavior.

XI CAUTIONS

The variables selected for inclusion within the study are based on past research and are the variables which are thought to have the greatest impact upon student achievement. However, it must be recognized that other variables, not included in the study, may have a stronger relationship to student achievement.

While the variety of analyses will lend support to the results, in that several statistical analyses yielding results which point to the same theoretical conclusion tend to provide support for the conclusion, it must be remembered that all of these analyses will be based on the same data. Therefore, the analyses will require validation with a second group of teachers, and with the same group during a second school year. This second analysis of the same teachers will include a new group of students. For these reasons, the study will be continued into Phase III during the 1974-75 school year. Phase III will allow for the validation of the results of the Phase II

work, as well as the expansion of the study to a larger number of experienced teachers and to a group of beginning teachers. The Phase III work will also allow for a refinement, if necessary, of the variables and the measures of the variables, based on the work of Phase II. Some variables may be dropped, others added or expanded. Some measurement procedures may be refined or altered. This planning and decision making will be based on all of the outcomes, statistical, experimental, and practical, of the Phase II work.

[1] See especially the following bibliographical references:

Bowles and Levin, "The Determinants of Scholastic Achievement"

Coleman, Equality of Educational Opportunity

Goodman, The Assessment of School Quality

Hanushek, "The Education of Negroes and Whites"

Levin, USOE, Do Teachers Make a Difference?

Rosenshine, Teaching Behaviors and Student Achievement

[2] Teacher Preparation and Licensing Law of 1970, Section 13114. Other states now seriously considering similar legislation are Iowa, Michigan, Minnesota and Pennsylvania. Moreover, about ten additional states are researching the issue.

[3] The Stull Act (Statutes of 1971). See especially Article 5.5

[4] Nie, Bent and Hull Statistical Package for the Social Sciences, McGraw-Hill Book Company, Inc.

[5] Cooley and Lohnes, Multivariante Data Analysis, John Wiley & Sons, Inc.

SUMMARY TASK LIST

A Analyze results of literature review

B Analyze and select existing instruments to measure all variables

C Revise existing and develop new instruments for variables as necessary

D Develop study data analysis system

E Select teacher sample

F Orient teachers and identify participants

G Develop teacher interview training program

H Plan teacher observations and train observers

I Collect Phase II initial student and teacher data

J Conduct feasibility sub-study

K Determine consistency of teacher behavior through analysis of sub-sample data

L Conduct video and audio taping

M Collect Phase II terminal data

N Analyze data from all data collection procedures

O Conduct Phase II outside evaluation/audit

P Plan interface with Phase III

Q Prepare Phase II technical report

R Prepare and publish Phase II summary report

A - ANALYZE RESULTS OF LITERATURE REVIEW

1. review parameters of literature review
2. review work completed in Phase I
3. determine extent of remaining literature review
4. review literature
5. summarize information
6. present variables identified in literature review
7. recommend variables to be included in study

B - ANALYZE AND SELECT EXISTING INSTRUMENTS TO MEASURE ALL VARIABLES

1. identify existing instruments
2. determine information to be compiled relating to each instrument
3. compile information relating to each instrument
4. review relation of instruments to variables of concern
5. review methodological problems related to instruments
6. review costs of instruments
7. review types of scores available
8. review scoring procedures available for instruments
9. review instrument administration time and procedures
10. determine criteria for instrument selection
11. select instruments to recommend for study

C - REVISE EXISTING AND DEVELOP NEW INSTRUMENTS FOR VARIABLES AS NECESSARY

1. identify areas requiring new measuring instruments
2. determine general type of data collection for areas requiring new measuring instruments
3. develop draft items for each instrument
4. develop directions for each instrument
5. identify persons/groups to review instruments
6. review draft instruments by persons/groups
7. review directions for draft instruments by persons/groups
8. revise draft instruments and directions based on review
9. print instruments for field test
10. determine administration procedures
11. determine sample size for field test
12. determine sampling procedure for field test
13. select sample for field test
14. determine training needed for field test administration of instruments
15. develop training presentations
16. determine training procedures
17. schedule training
18. schedule substitutes for teachers as necessary

19. conduct training for field test administration

20. field test instruments

21. collect results

22. collect observations of field test administrators

23. review observations of administrators

24. analyze results of field trials

25. review instruments to determine non-promising instruments to be dropped from further development

26. conduct item analysis

27. review item analysis

28. determine items to be retained in instruments

29. determine items to be re-written

30. re-write items

31. finalize instruments

32. review directions

33. review instrument format

34. re-format instruments, if necessary

35. re-write directions, if necessary

36. finalize format

37. finalize directions

38. review scoring procedures

39. review possible procedures for determining instrument reliability

40. determine procedures to be used for determining instrument reliability

41. determine sample size for reliability determination administration

42. determine sampling procedure for reliability determination administration

43. select sample for reliability determination administration

44. train administrators

45. distribute instruments

46. administer instruments

47. collect instruments

48. score instruments

49. analyze data and compute reliability for instruments

D - DEVELOP STUDY DATA ANALYSIS SYSTEM

1. submit information systems management plan
2. identify statistical analyses to be performed
3. review packaged statistical programs
4. select appropriate packaged programs
5. identify additional statistical programming needs
6. identify data report formats
7. identify data input and update programming needs
8. identify input formats for all data
9. develop input and update programs
10. run sample reports based on sample study input data
11. de-bug programs based on sample data inputs and reports
12. determine schedule of data input
13. determine schedule of data reports
14. determine schedule of data analyses
15. final revision of input data needs based on initial data
16. final revision of programs based on initial data
17. final revision of reports based on initial reports
18. update, revise, and distribute final information system management plan

E - SELECT TEACHER SAMPLE

1. identify logistically feasible communities
2. determine population characteristics
3. identify general income category of communities
4. stratify schools by income category
5. determine numbers of schools in each category
6. determine approximate numbers of grade 2 and grade 5 teachers in each school
7. identify all teachers, grades 2 and 5, in sample schools
8. remove names of teachers who do not fit criteria
9. select random sample of teachers, grades 2 and 5

F - ORIENT TEACHERS AND IDENTIFY PARTICIPANTS

1. develop presentation of study purposes and procedures

2. determine school and teacher involvement in terms of time, personnel, tasks, data requirements

3. identify all possible teacher motivations

4. develop presentation of school and teacher involvement

5. determine procedures for presentation to schools and teachers -- individual or group presentation

6. contact schools in sample

7. schedule presentations

8. make presentations

9. secure school and teacher cooperation

G - DEVELOP TEACHER INTERVIEW TRAINING PROGRAM

1. identify information needed
2. develop questions for interview
3. identify persons/groups to review interview schedule
4. review of draft interview schedule by persons/groups
5. revise interview based on review
6. print schedules for field tests
7. develop training for interviewers
8. develop procedure for recording observations of field test
9. train interviewers
10. determine sample size for field test
11. determine sampling procedure for field test
12. select sample for field test
13. field test the interview schedule
14. collect information
15. revise interview schedule based on field test

II - PLAN TEACHER OBSERVATIONS AND TRAIN OBSERVERS

1. identify observers
2. determine observing procedures
3. determine observation recording format
4. review existing observation instruments
5. select appropriate instrument
6. if instrument development is necessary, develop draft items for observation recording instrument
7. identify persons/ groups to review instruments
8. review draft instrument by person/groups
9. revise instrument based on review
10. print observation recording instrument for field test
11. determine sample size for field test
12. determine sampling procedure for field test, select sample
13. develop procedure for recording comments of observers after field test
14. develop training procedures for observers
15. schedule training of observers
16. conduct training of observers
17. schedule observation recording instrument field test
18. conduct field test of observation recording instrument

19. compile instrument results

20. compile observer comments and reactions

21. revise instrument

22. develop observer training process

23. schedule observer training

24. compile materials needed for observer training

25. develop materials needed for observer training

26. train observers

27. determine number of observations in each classroom

28. determine overall schedule of observations

I - COLLECT PHASE II INITIAL STUDENT & TEACHER DATA

1. print instruments
2. print directions
3. develop training procedures for instrument administrators
4. develop materials for training of instrument administrators
5. schedule training for instrument administrators
6. schedule substitutes as needed for teachers
7. conduct training for instrument administrators
8. schedule instrument administration
9. administer instruments
10. collect instruments
11. compile data
12. schedule interviews
13. schedule substitutes
14. conduct interviews
15. compile interview data

J - CONDUCT FEASIBILITY SUB-STUDY

1. identify teachers for consistency sub-study
2. compile pre-test data
3. observe teachers in consistency sub-study
4. compile data from first observations of consistency sub-sample
5. conduct initial data analysis; descriptive statistics
6. test data to determine that statistical test assumptions are met
7. compute correlation coefficients
8. review data collection procedures in terms of feasibility for Phase II, Phase III
9. review computer procedures in terms of feasibility for Phase II, Phase III
10. review data collection instruments in terms of data collected; adequacy, suitability for data analyses
11. review computer printouts in terms of adequacy of information presented, understandability of format

K - DETERMINE CONSISTENCY OF TEACHER BEHAVIOR THROUGH ANALYSIS OF SUB-SAMPLE DATA

1. select 10% sub-sample of teachers
2. finalize observation schedule
3. conduct observations and video taping
4. compile data
5. analyze data
6. compute statistics

L - CONDUCT VIDEO AND AUDIO TAPING

1. identify teaching times
2. notify teachers of video taping weeks
3. determine teacher-selected times
4. select random times
5. schedule video taping
6. conduct video taping
7. analyze video tapes
8. compile data
9. identify audio taping procedures
10. distribute audio tape equipment
11. conduct audio taping
12. collect audio tapes
13. develop analysis procedures
14. analyze audio tapes
15. compile data
16. analyze audio and video tape data
17. video tape for teacher-use
18. return teacher-use video tape to teacher

M - COLLECT PHASE II TERMINAL DATA

1. print instruments
2. print directions
3. develop training procedures for instrument administrators
4. develop materials for training of instrument administrators
5. schedule training for instrument administrators
6. schedule substitutes as needed for teachers
7. conduct training for instrument administrators
8. schedule instrument administration
9. administer instruments
10. collect instruments
11. compile data

N - ANALYZE DATA FROM ALL DATA COLLECTION PROCEDURES

1. prepare data for computer input
2. input and compile data
3. compute descriptive statistics
4. compute intercorrelation matrices
5. compute tests to determine that data meet the assumptions of the statistical procedures
6. compute partial correlations (second and third order correlations)
7. compute multiple regressions for each dependent measure
8. compute index of pupil achievement based on all dependent measures
9. compute multiple regression for index of pupil achievement
10. compute factor analysis of independent variables
11. compute factor scores
12. compute multiple regression with factor scores
13. analyze data from teacher behavior consistency sub-sample

O - CONDUCT PHASE II OUTSIDE EVALUATION/AUDIT

1. review tasks to be accomplished
2. review assignment of responsibilities for tasks
3. review scheduling of tasks
4. review detailed design
5. suggest record keeping procedures which may facilitate the audit process
6. review project documents to determine completion of tasks
7. review any modifications in terms of rationale for and documentation of modifications and student achievement.
8. review instrument field test procedure
9. determine appropriateness of field test procedures
10. review cooperation of schools and teachers

P - PLAN INTERFACE WITH PHASE III

1. review data analysis procedures for Phase II
2. develop data analysis plan for Phase III
3. review data analysis plan for Phase III in light of review of Phase II data analysis plan
4. review selection procedures for teachers and schools in Phase II
5. determine sample size for Phase III
6. develop sampling procedures for Phase III
7. select sample of teachers and schools for Phase III
8. develop procedures for contacting districts and schools
9. develop presentation for schools and districts in Phase III, explaining study and involvement of schools and districts.
10. review instruments from Phase II
11. determine instrument revision needs for Phase III
12. revise instruments for Phase III
13. field test revised instruments for Phase III
14. develop schedule of instrument administration for Phase III
15. determine training needs for Phase III
16. develop training procedures for Phase III

17. schedule training for Phase III

18. develop training materials for Phase III

19. determine instrument distribution procedures for Phase III

20. determine instrument collection procedures for Phase III

21. determine computer input procedures for Phase III

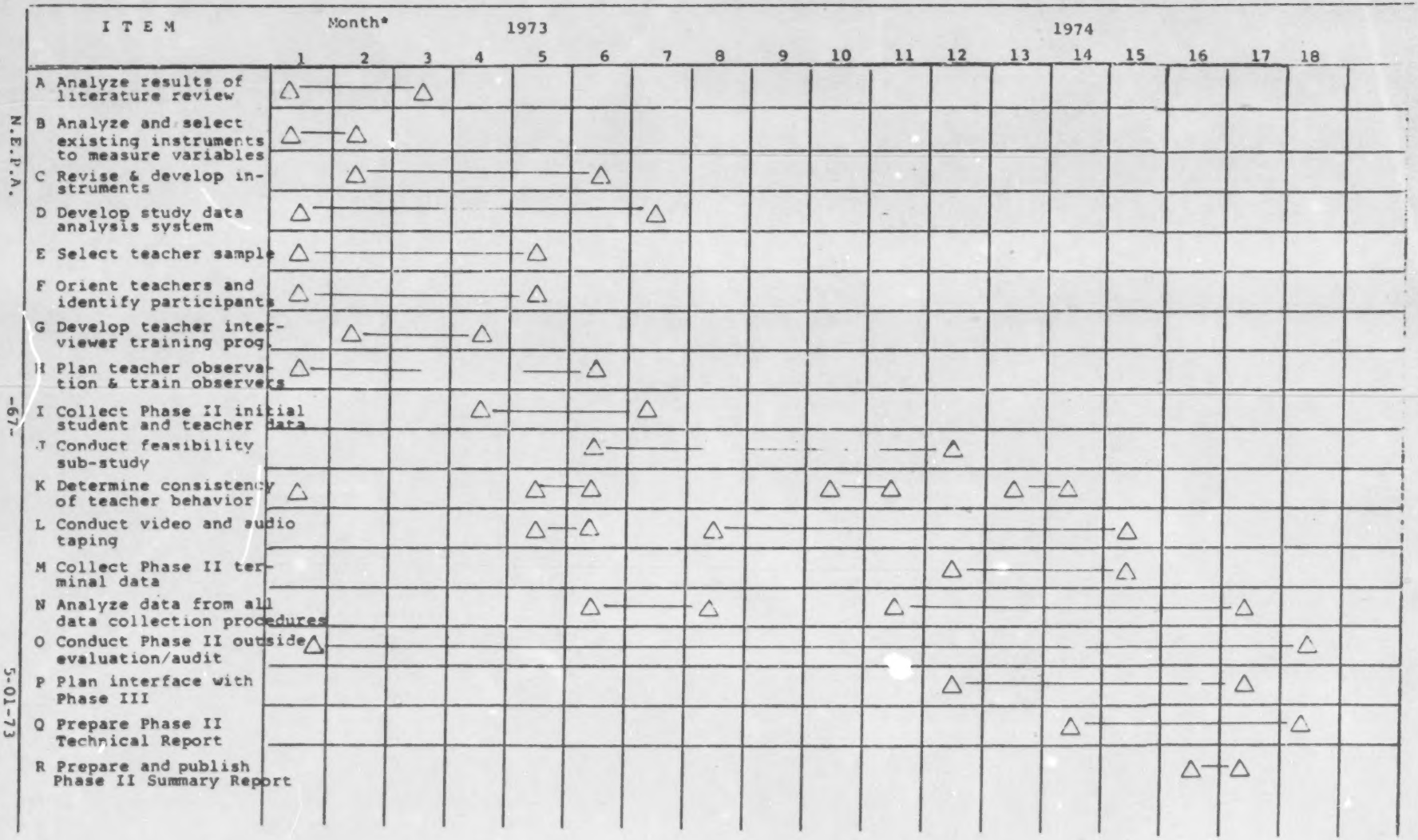
22. determine schedule of computer data analysis for Phase III

Q - PREPARE PHASE II TECHNICAL REPORT

1. duplicate computer print-outs
2. compile and summarize results of computer print-outs
3. develop data presentation tables
4. write draft of narrative of computer print-outs
5. determine data to be presented in appendices
6. submit draft of report to consultants for review
7. schedule consultant review conference
8. conduct consultant review conference
9. revise draft of report
10. develop recommendations based on consultant review conference
11. submit finalized technical report

R - PREPARE AND PUBLISH PHASE II SUMMARY REPORT

1. write report for general readers
2. review report for general readers
3. revise report for general readers
4. print report for general readers (10,000)
5. identify information for oral presentations of study to groups
6. develop format for oral presentation
7. develop oral presentation
8. develop visuals to accompany oral presentation
9. review oral presentation
10. revise oral presentation
11. identify groups to receive oral presentation
12. schedule oral presentations
13. conduct oral presentations

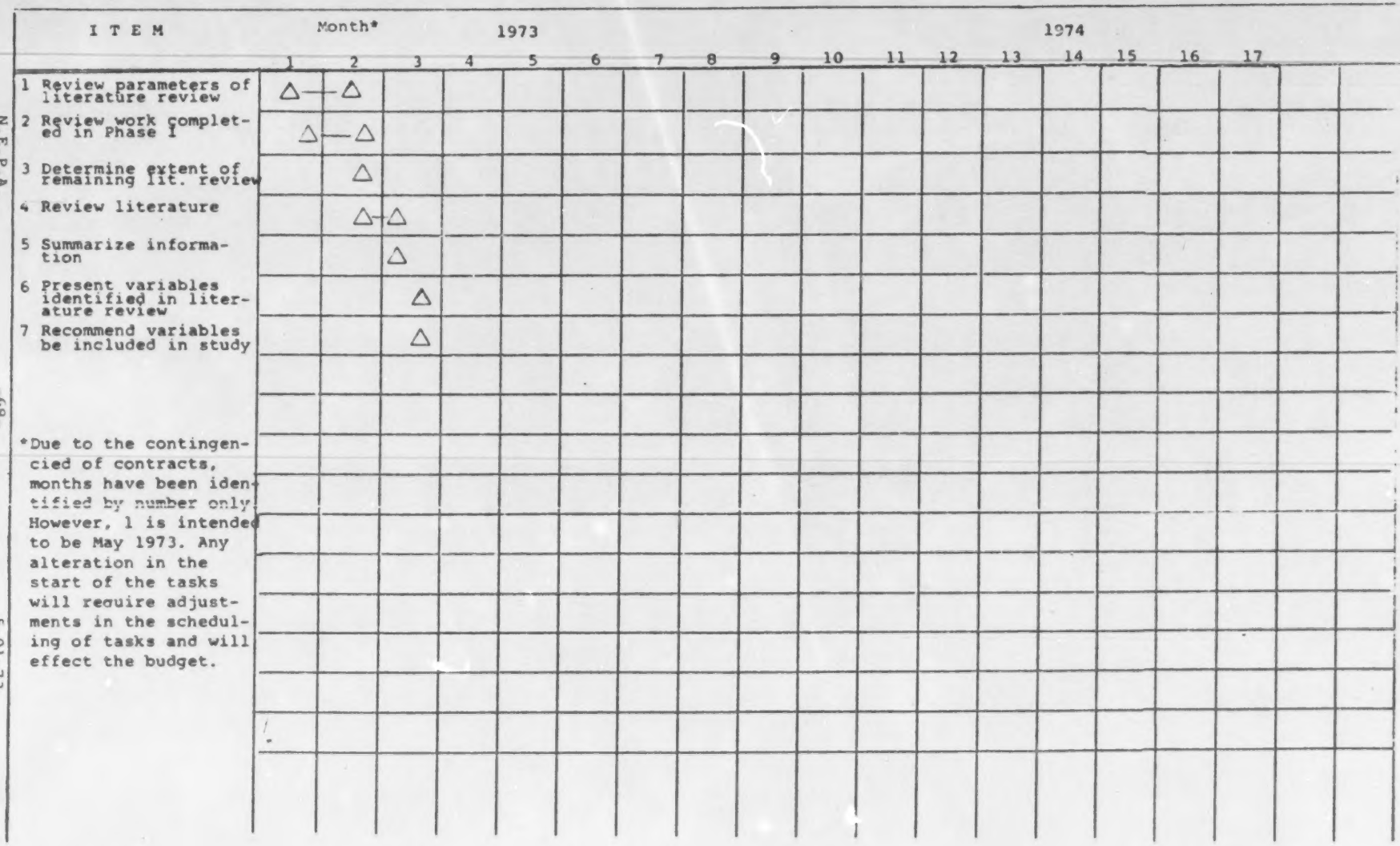

ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A Analyze results of literature review
B Analyze and select existing instruments to measure variables
C Revise & develop instruments
D Develop study data analysis system
E Select teacher sample
F Orient teachers and identify participants
G Develop teacher interviewer training prog.
H Plan teacher observation & train observers
I Collect Phase II initial student and teacher data
J Conduct feasibility sub-study
K Determine consistency of teacher behavior
L Conduct video and audio taping
M Collect Phase II terminal data
N Analyze data from all data collection procedures
O Conduct Phase II outside evaluation/audit
P Plan interface with Phase III
Q Prepare Phase II Technical Report
R Prepare and publish Phase II Summary Report

N.E.P.A.

-67-

5-01-73

A - Analyze results of literature review


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Review parameters of literature review
2 Review work completed in Phase I
3 Determine extent of remaining lit. review
4 Review literature
5 Summarize information
6 Present variables identified in literature review
7 Recommend variables be included in study
*Due to the contingencied of contracts, months have been identified by number only. However, 1 is intended to be May 1973. Any alteration in the start of the tasks will require adjustments in the scheduling of tasks and will effect the budget.

N.E.P.A.
-68-
5-01-73

B - Analyze and select existing instruments to measure all variables

ITEM	Month* 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	1973													1974			
1 Identify existing instruments	△																
2 Determine information to be compiled		△															
3 compile information relating to instruments		△-△															
4 Review instruments and variables		△															
5 Review methodological problems of instruments		△															
6 Review costs of instruments		△															
7 Review types of scores available		△															
8 Review scoring procedures available		△															
9 Review instrument administration time		△															
10 Determine criteria for instrument selection		△															
11 Select instruments		△															

N.E.F.A.

-69-

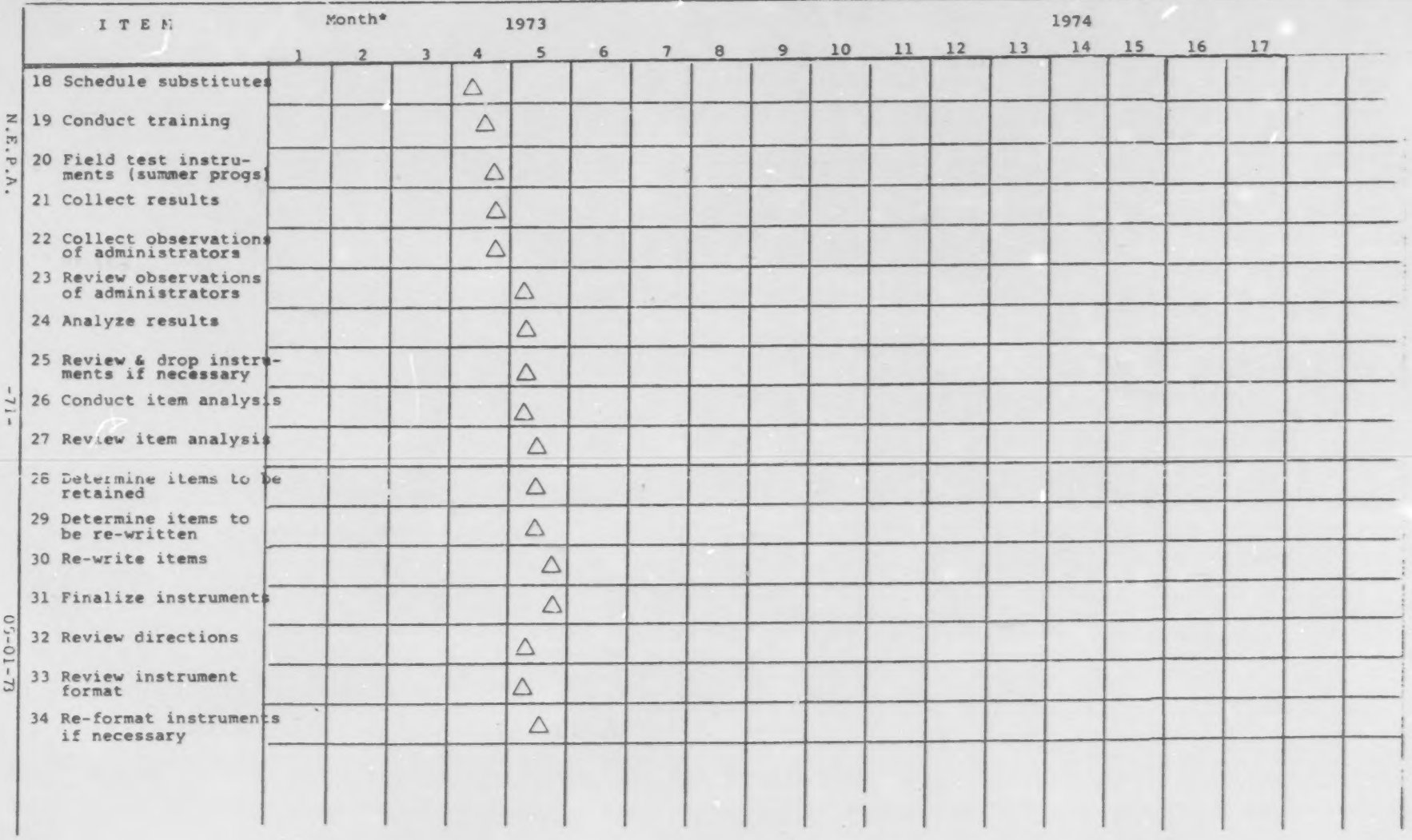
5-01-73

C- Revise existing and develop new instruments for variables - as necessary

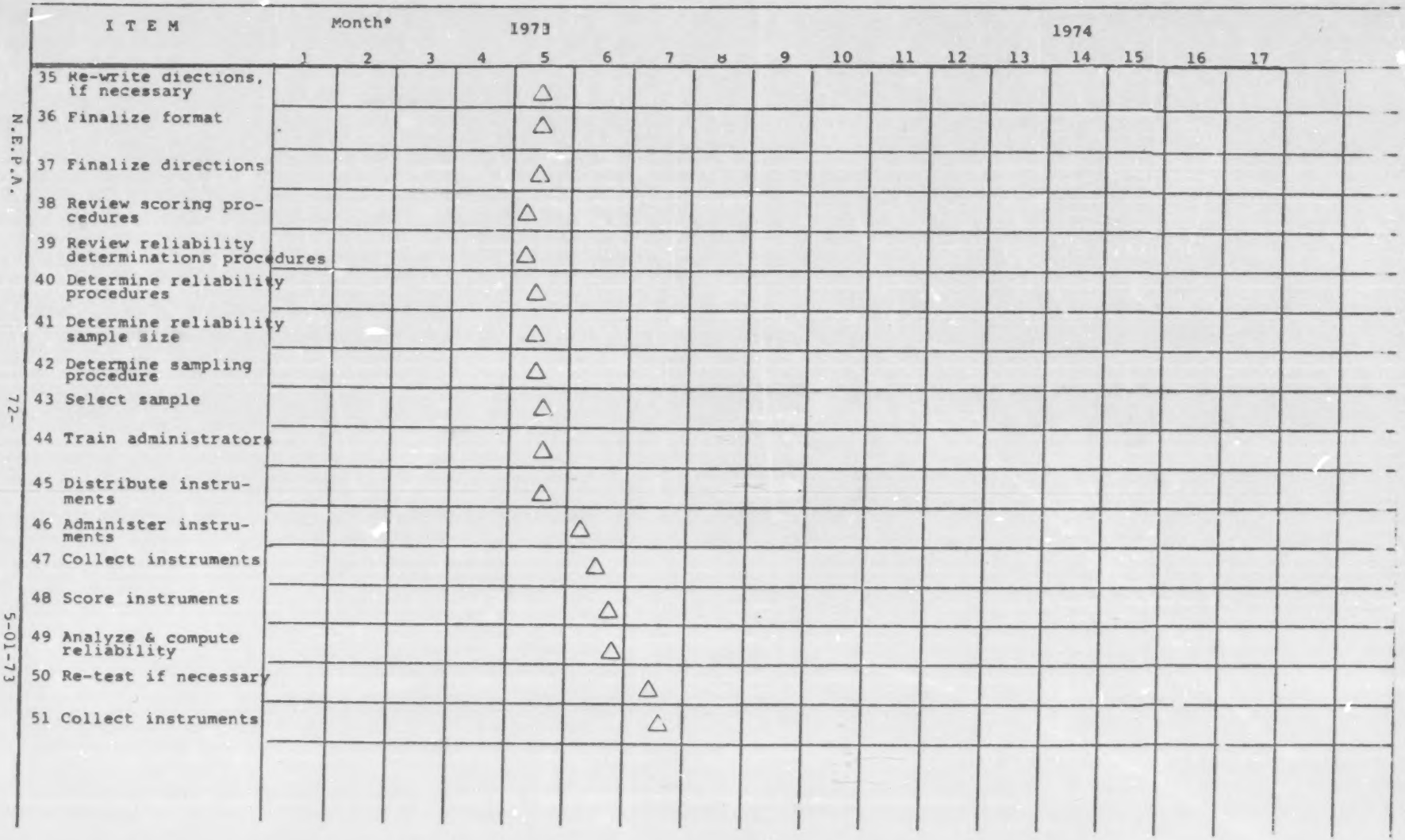
ITEM	Month* 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	1973												1974				
1 Determine areas requiring new instrumts		△															
2 Determine type of data collection			△														
3 Develop draft items			△-△														
4 Develop draft directions			△														
5 Identify persons/groups to review instruments			△														
6 Review draft instruments			△														
7 Review draft directions			△														
8 Revise drafts based on review				△													
9 Print for field test				△													
10 Determine administration procedures			△														
11 Determine field test sample size			△														
12 Determine field test sampling procedures			△														
13 Select sample for field test (summer prog)				△													
14 Determine needed training for field test			△														
15 Develop training presentation				△													
16 Determine training procedures				△													
17 Schedule training				△													

N.E.P.A. -70- 5-01-73

C-2


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 Schedule substitutes
19 Conduct training
20 Field test instruments (summer progs)
21 Collect results
22 Collect observations of administrators
23 Review observations of administrators
24 Analyze results
25 Review & drop instruments if necessary
26 Conduct item analysis
27 Review item analysis
28 Determine items to be retained
29 Determine items to be re-written
30 Re-write items
31 Finalize instruments
32 Review directions
33 Review instrument format
34 Re-format instruments if necessary

N.E.P.A. -71- 05-01-73

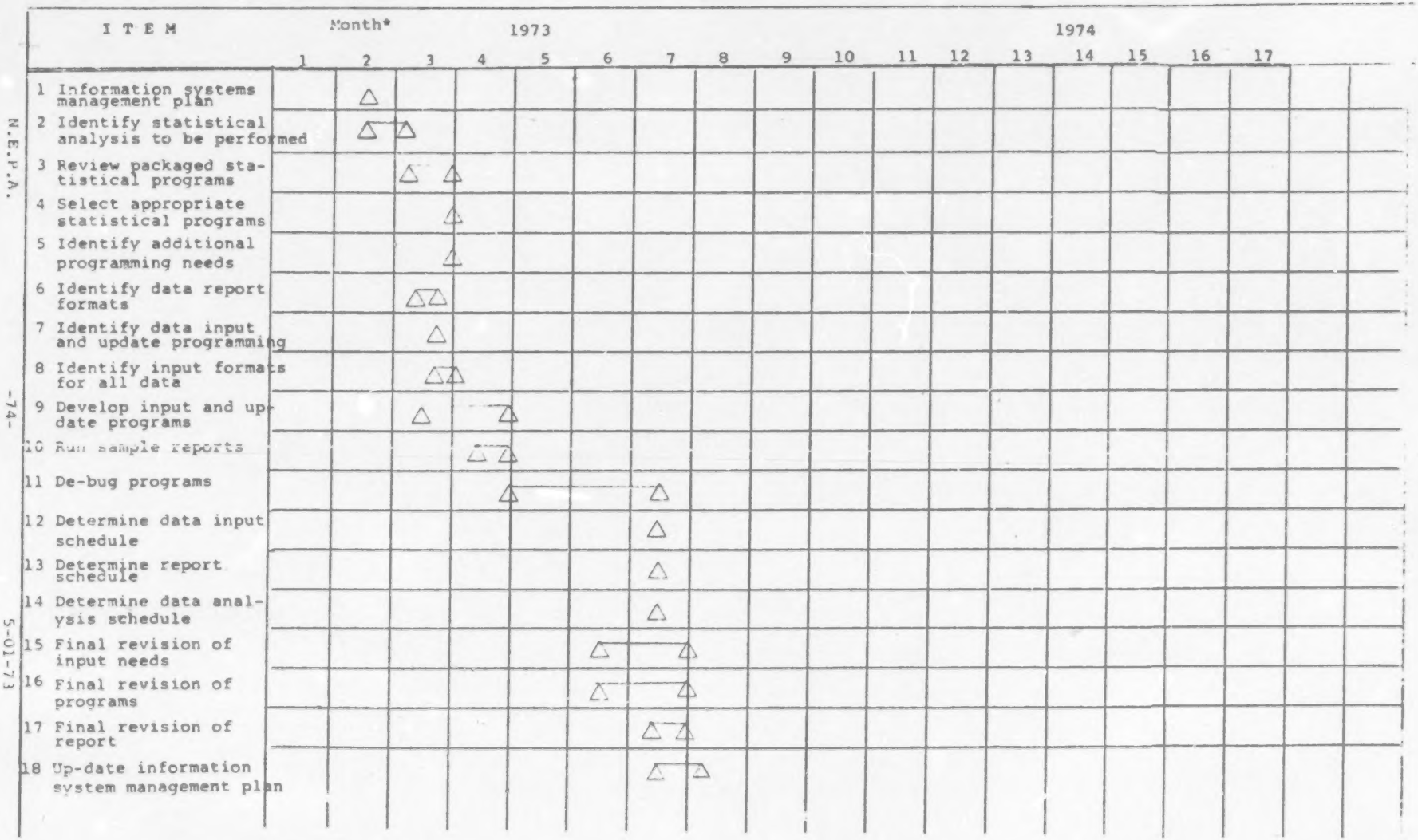

ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
35 Re-write diections, if necessary
36 Finalize format
37 Finalize directions
38 Review scoring procedures
39 Review reliability determinations procedures
40 Determine reliability procedures
41 Determine reliability sample size
42 Determine sampling procedure
43 Select sample
44 Train administrators
45 Distribute instruments
46 Administer instruments
47 Collect instruments
48 Score instruments
49 Analyze & compute reliability
50 Re-test if necessary
51 Collect instruments
N.E.P.A.
72-
5-01-73

C-4

ITEM	Month* 1	2	3	4	5	6	7	8	9	10	11	12	1973 13	14	15	16	17	1974
52 Score instruments							△											
53 Analyze and compute reliability							△											

N.E.P.A. -71- 5-01-73

D Develop studh data analysis system


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Information systems management plan
2 Identify statistical analysis to be performed
3 Review packaged statistical programs
4 Select appropriate statistical programs
5 Identify additional programming needs
6 Identify data report formats
7 Identify data input and update programming
8 Identify input formats for all data
9 Develop input and update programs
10 Run sample reports
11 De-bug programs
12 Determine data input schedule
13 Determine report schedule
14 Determine data analysis schedule
15 Final revision of input needs
16 Final revision of programs
17 Final revision of report
18 Up-date information system management plan

N.E.P.A.

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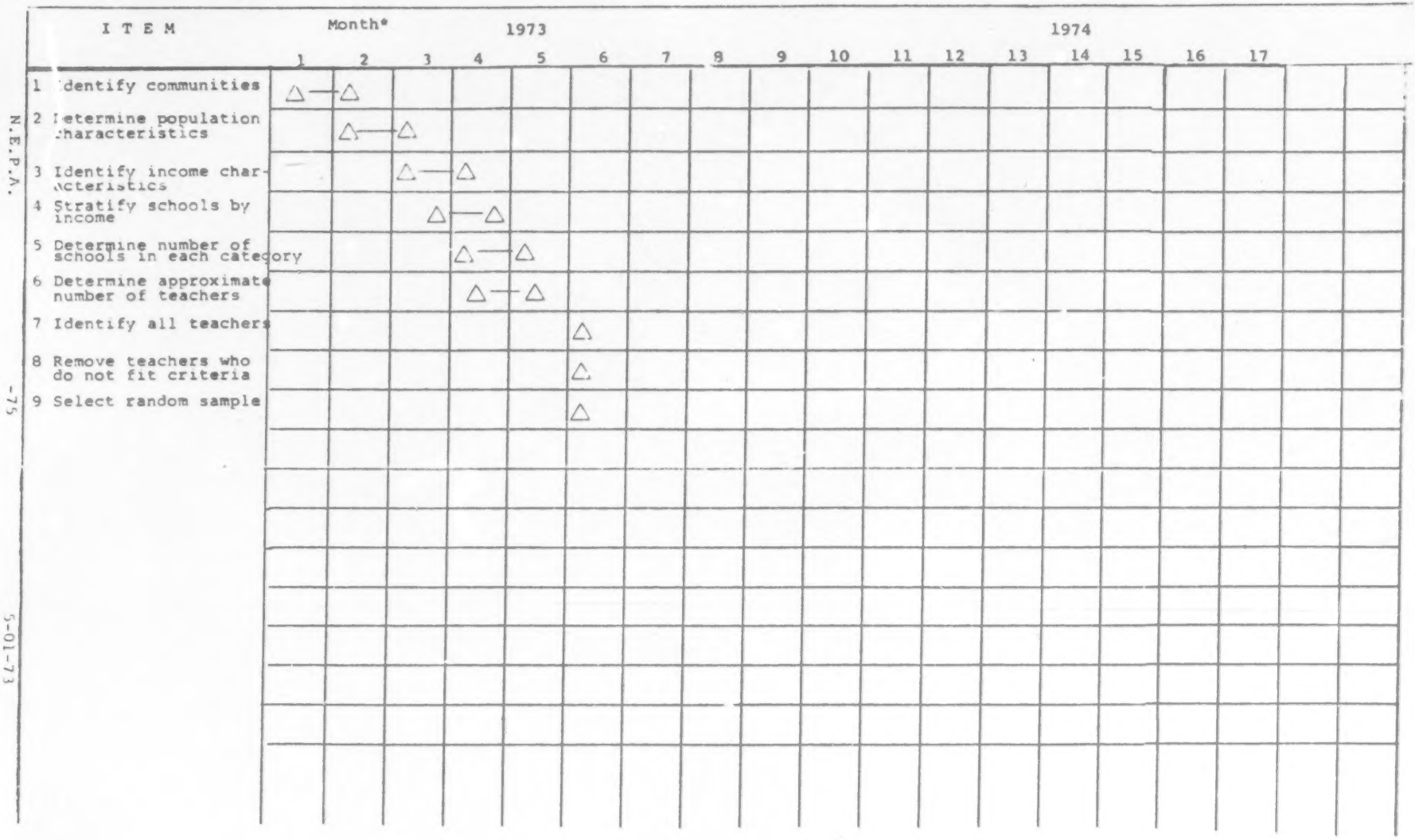
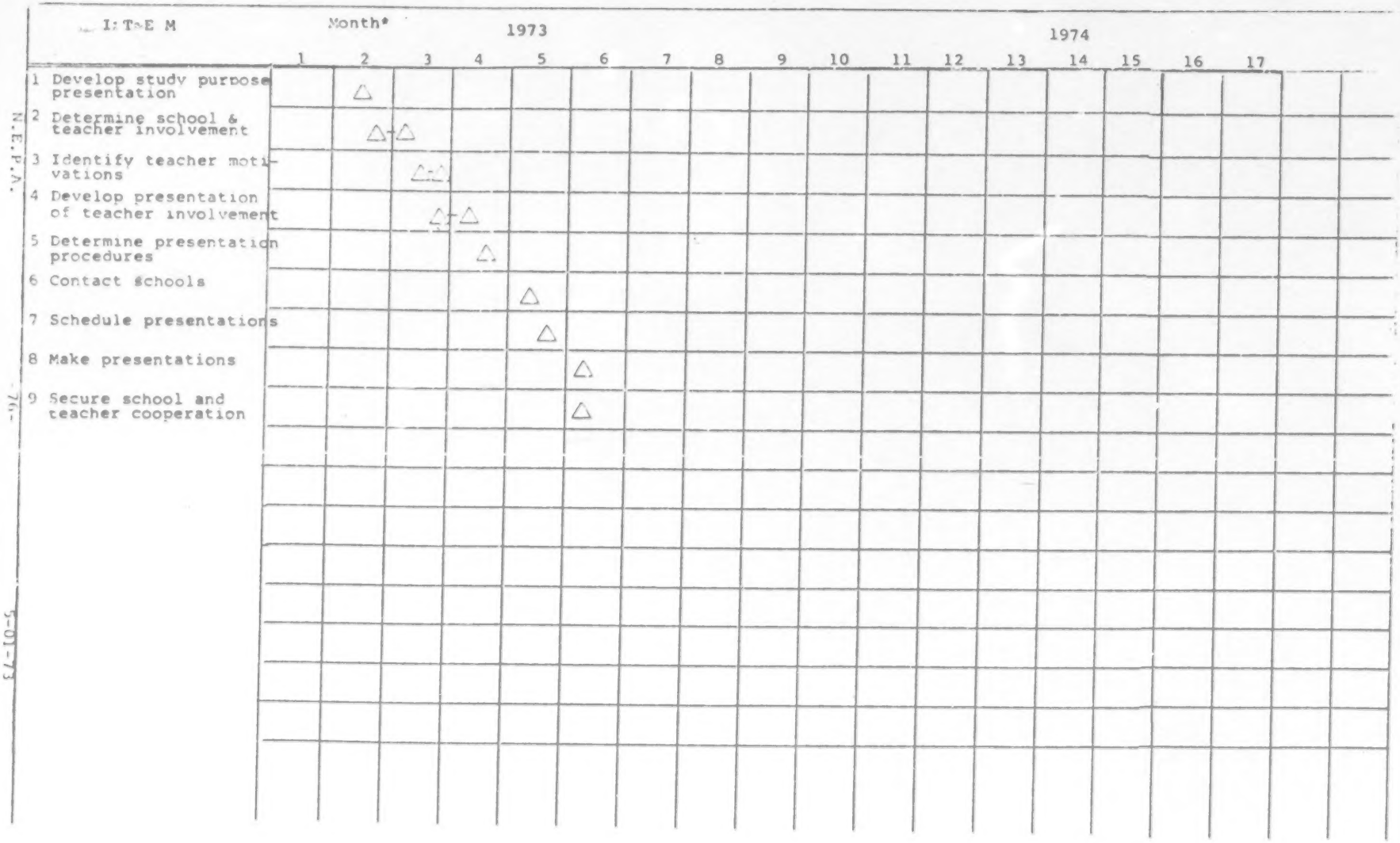
5-01-73

E Select Teacher Sample

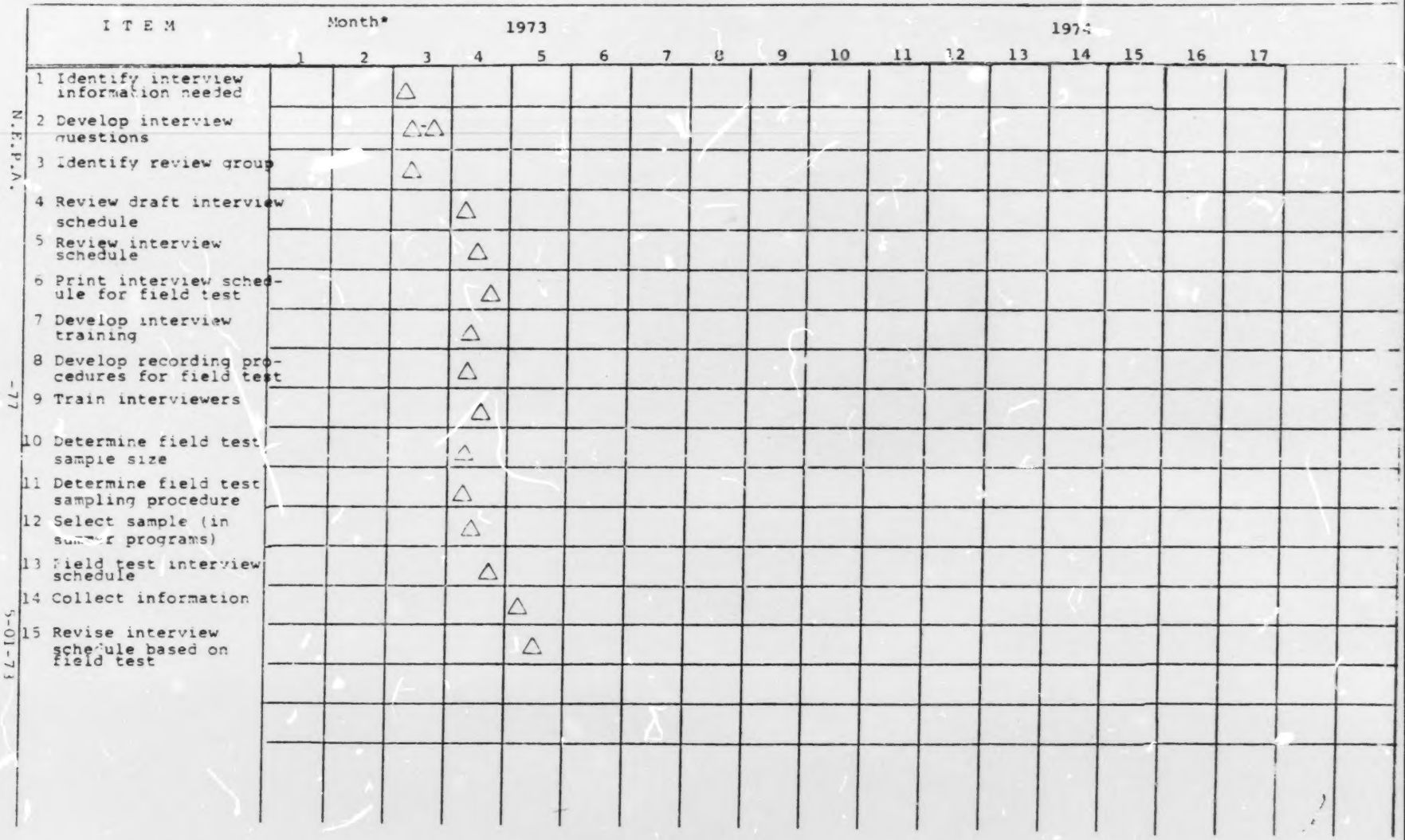

ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Identify communities
2 Determine population characteristics
3 Identify income characteristics
4 Stratify schools by income
5 Determine number of schools in each category
6 Determine approximate number of teachers
7 Identify all teachers
8 Remove teachers who do not fit criteria
9 Select random sample

N.E.P.A. -75 5-01-73

F - Orient teachers and identify participants


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Develop study purpose presentation
2 Determine school & teacher involvement
3 Identify teacher motivations
4 Develop presentation of teacher involvement
5 Determine presentation procedures
6 Contact schools
7 Schedule presentations
8 Make presentations
9 Secure school and teacher cooperation

G - Develop teacher interview or training program


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Identify interview information needed
2 Develop interview questions
3 Identify review group
4 Review draft interview schedule
5 Review interview schedule
6 Print interview schedule for field test
7 Develop interview training
8 Develop recording procedures for field test
9 Train interviewers
10 Determine field test sample size
11 Determine field test sampling procedure
12 Select sample (in summer programs)
13 Field test interview schedule
14 Collect information
15 Revise interview schedule based on field test
N.E.P.A.
-77
5-01-73

H - Plan teacher observation and train observers

ITEM	Month* 1	2	3	4	5	6	7	8	9	10	11	12	1973 13	14	15	16	1974 17
1 Identify observers				△													
2 Determine observation procedures		△															
3 Determine observation recording format		△															
4 Review existing observation instruments		△															
5 Select appropriate instruments		△															
6 Develop draft for new instruments			△-△														
7 Identify review group			△														
8 Review draft			△														
9 Revise based on review			△-△														
10 Print observation format for field test				△													
11 Determine field test sample size			△														
12 Determine field test sampling procedure				△													
13 Develop observer coment recording procedure				△													
14 Develop observer training				△													
15 Schedule observer training				△													
16 Conduct observer training				△													
17 Schedule observation field test				△													

N.E.P.A.

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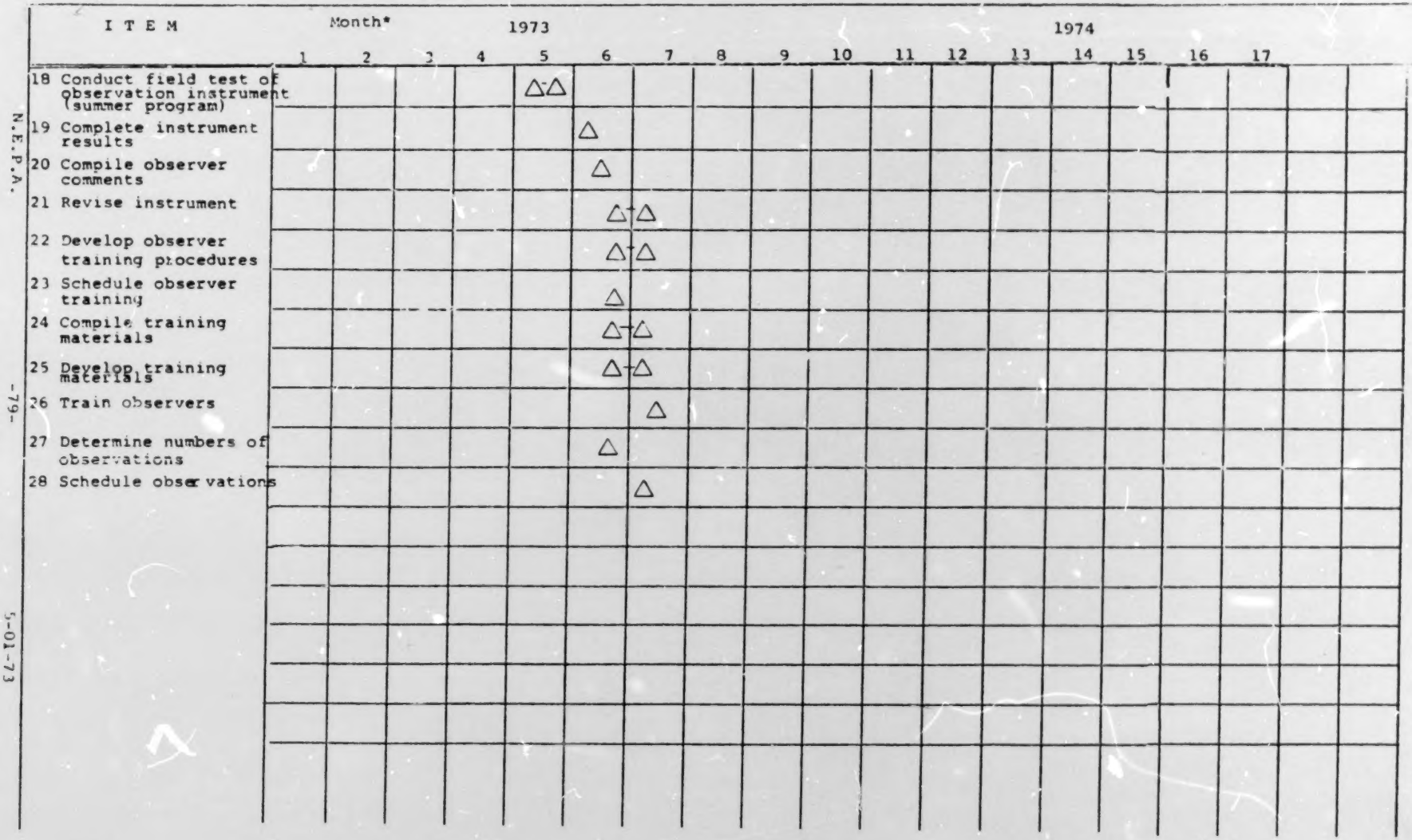
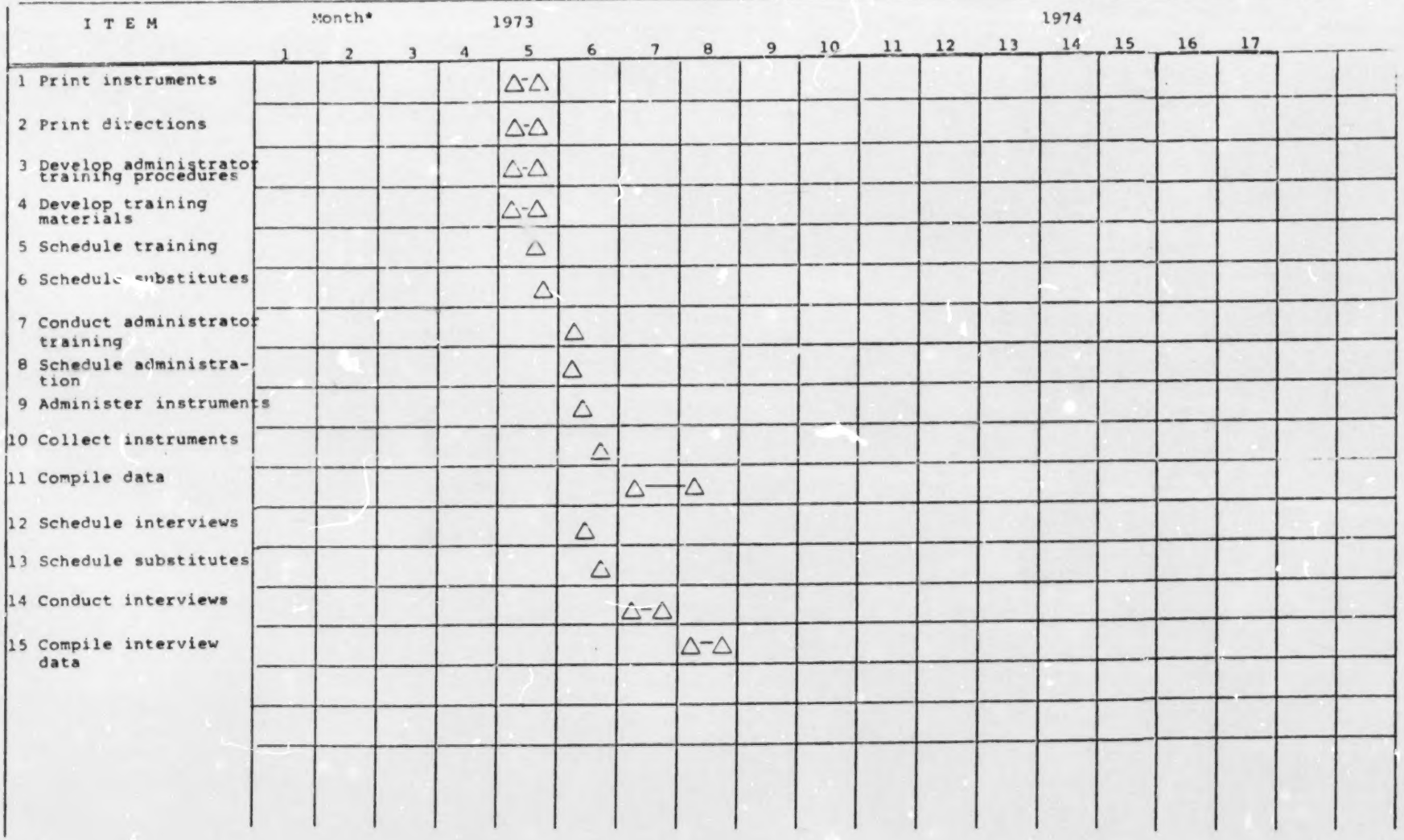
5-01-73

H-2 continued


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 Conduct field test of observation instrument (summer program)
19 Complete instrument results
20 Compile observer comments
21 Revise instrument
22 Develop observer training procedures
23 Schedule observer training
24 Compile training materials
25 Develop training materials
26 Train observers
27 Determine numbers of observations
28 Schedule observations

I Collect Phase II initial student and teacher data

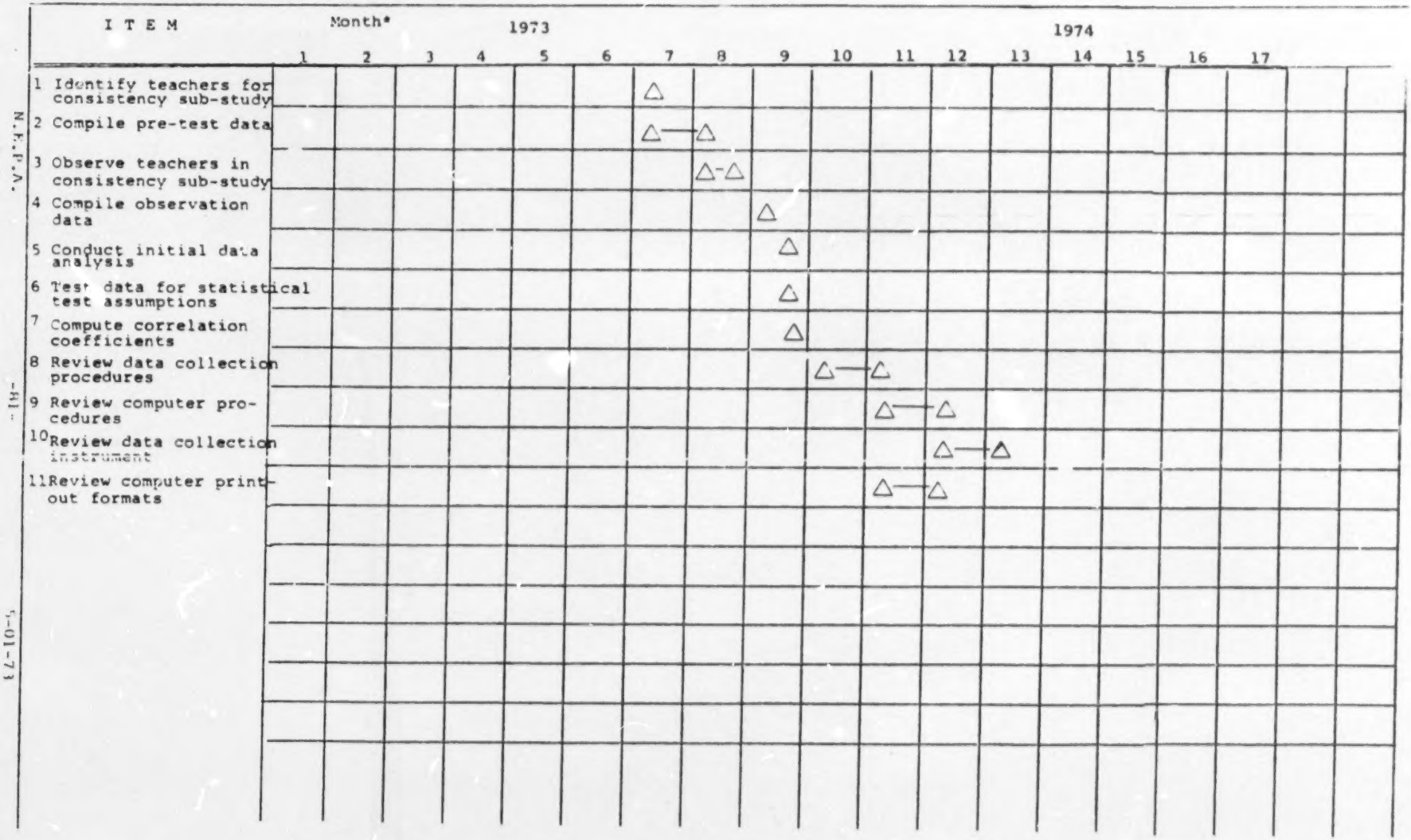


N.E.P.A.

-80-

5-01-73

J - Conduct feasibility sub-study


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Identify teachers for consistency sub-study
2 Compile pre-test data
3 Observe teachers in consistency sub-study
4 Compile observation data
5 Conduct initial data analysis
6 Test data for statistical test assumptions
7 Compute correlation coefficients
8 Review data collection procedures
9 Review computer procedures
10 Review data collection instrument
11 Review computer print-out formats

N.F.P.V.

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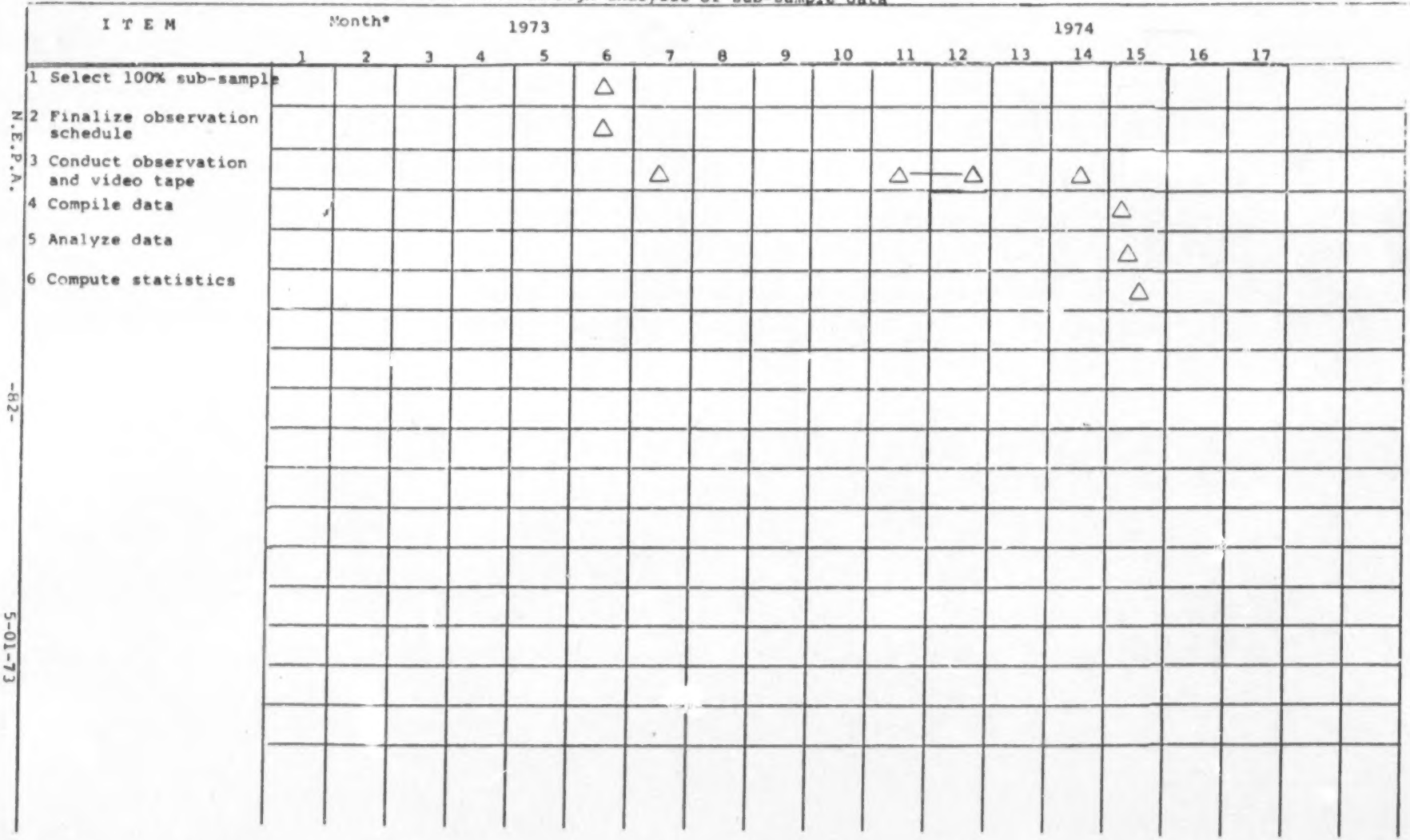
1-01-73

K - Determine consistency of teacher behavior through analysis of sub-sample data


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Select 100% sub-sample
2 Finalize observation schedule
3 Conduct observation and video tape
4 Compile data
5 Analyze data
6 Compute statistics

N.E.P.A.

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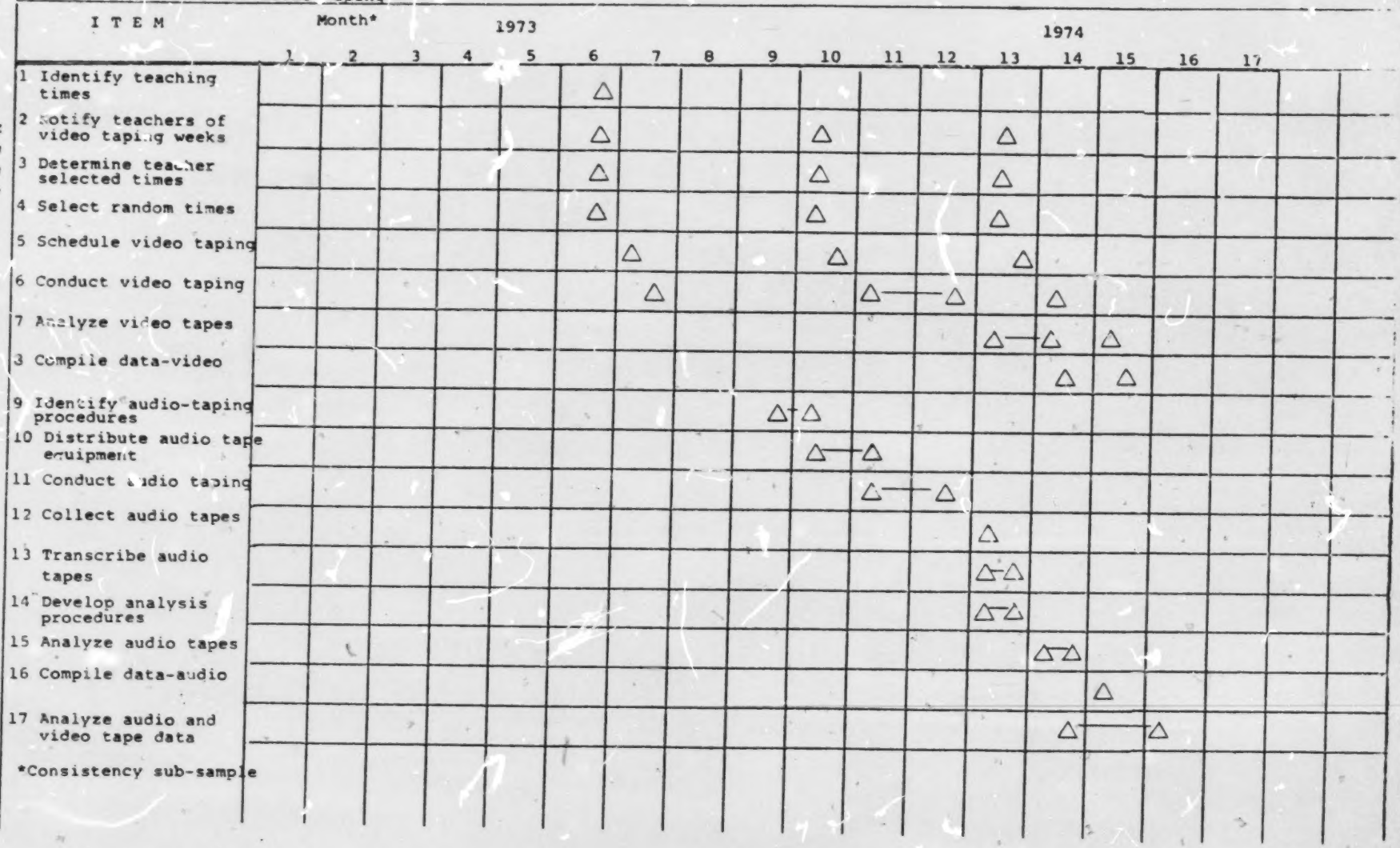
5-01-73

L - Conduct video and audio taping


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Identify teaching times
2 Notify teachers of video taping weeks
3 Determine teacher selected times
4 Select random times
5 Schedule video taping
6 Conduct video taping
7 Analyze video tapes
8 Compile data-video
9 Identify audio-taping procedures
10 Distribute audio tape equipment
11 Conduct audio taping
12 Collect audio tapes
13 Transcribe audio tapes
14 Develop analysis procedures
15 Analyze audio tapes
16 Compile data-audio
17 Analyze audio and video tape data
*Consistency sub-sample

N.E.P.A.

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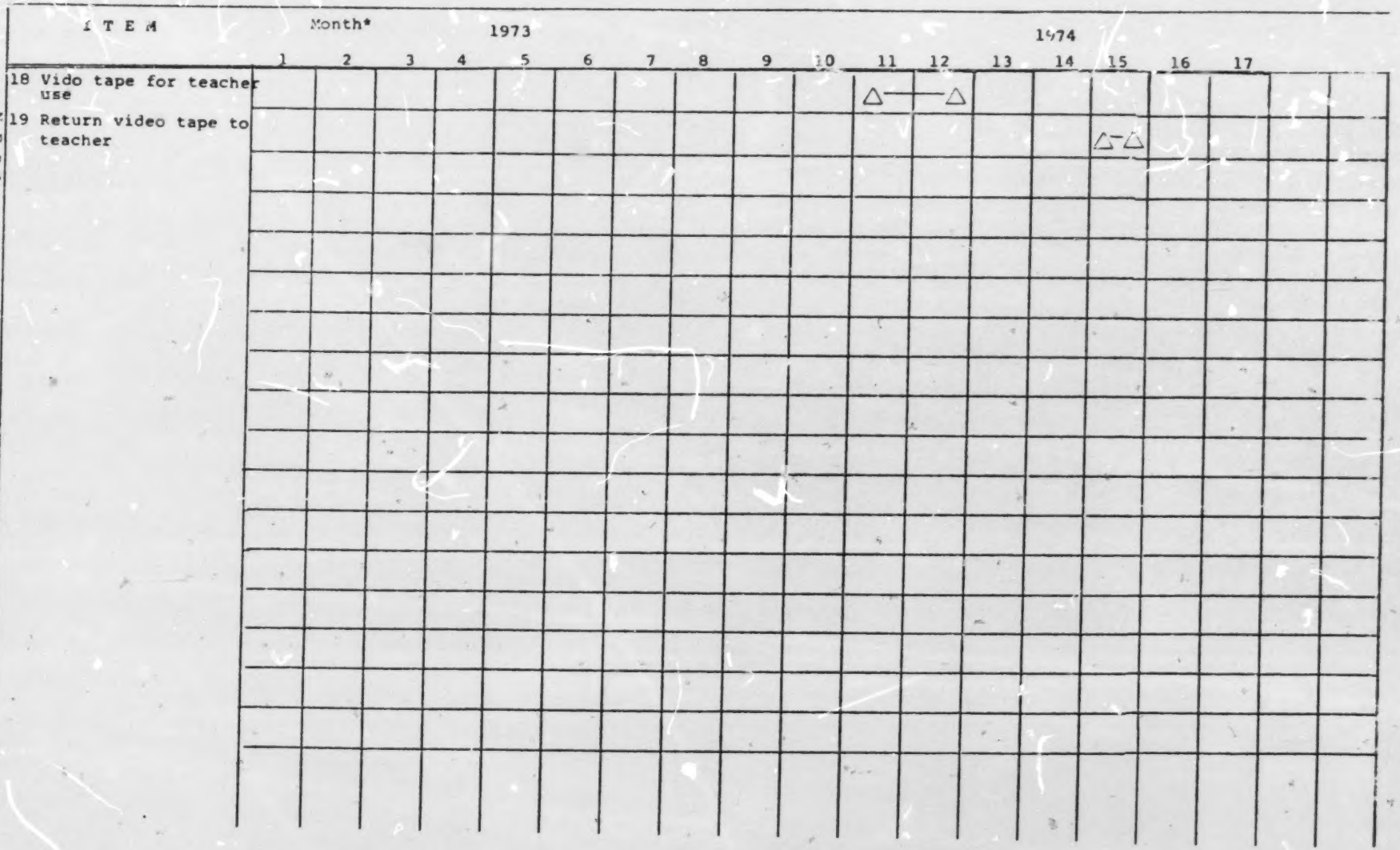
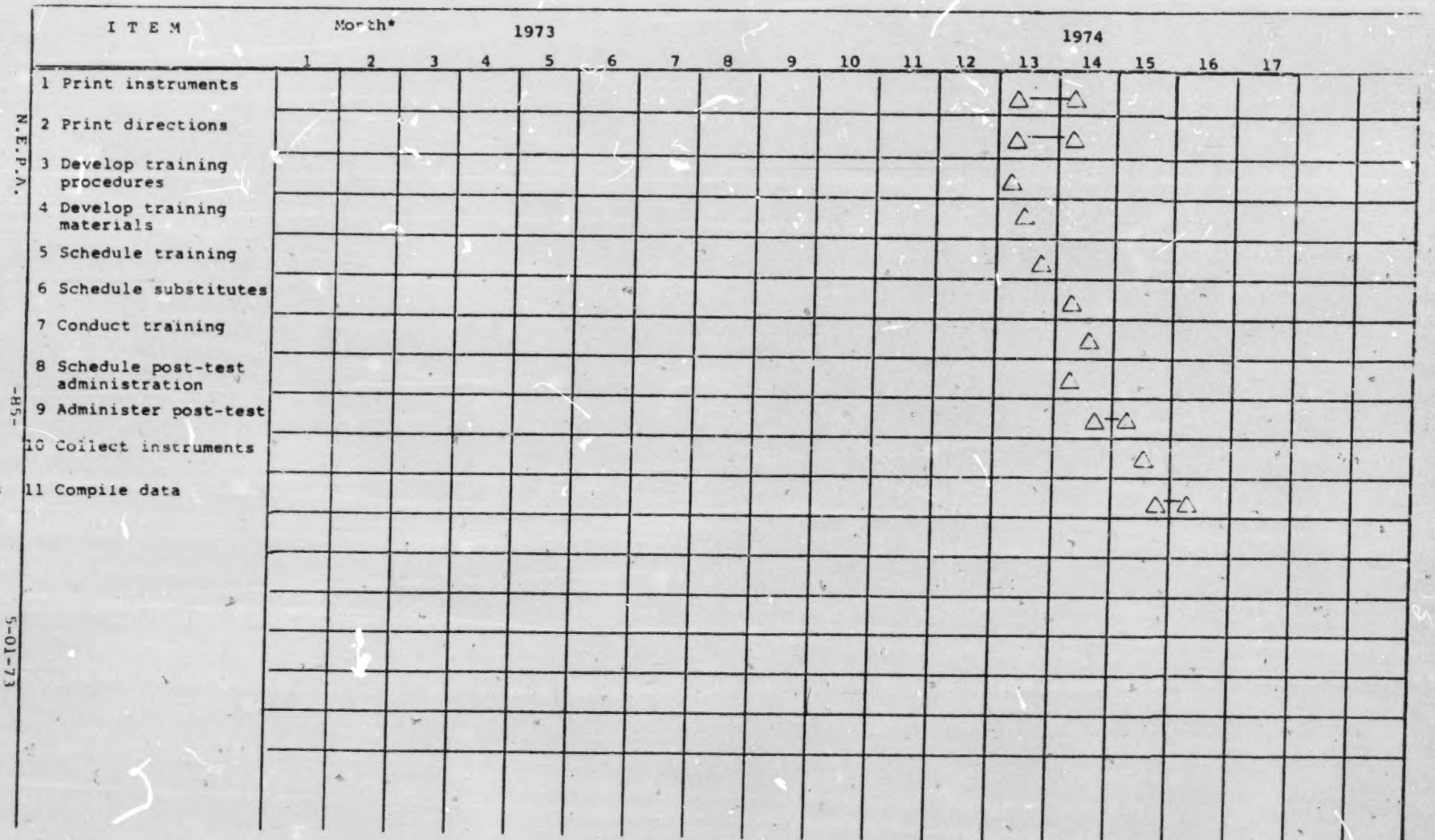
5-01-73

L - 2



N.E.P.A. -84- 5-01-73

M - Collect Phase II terminal data

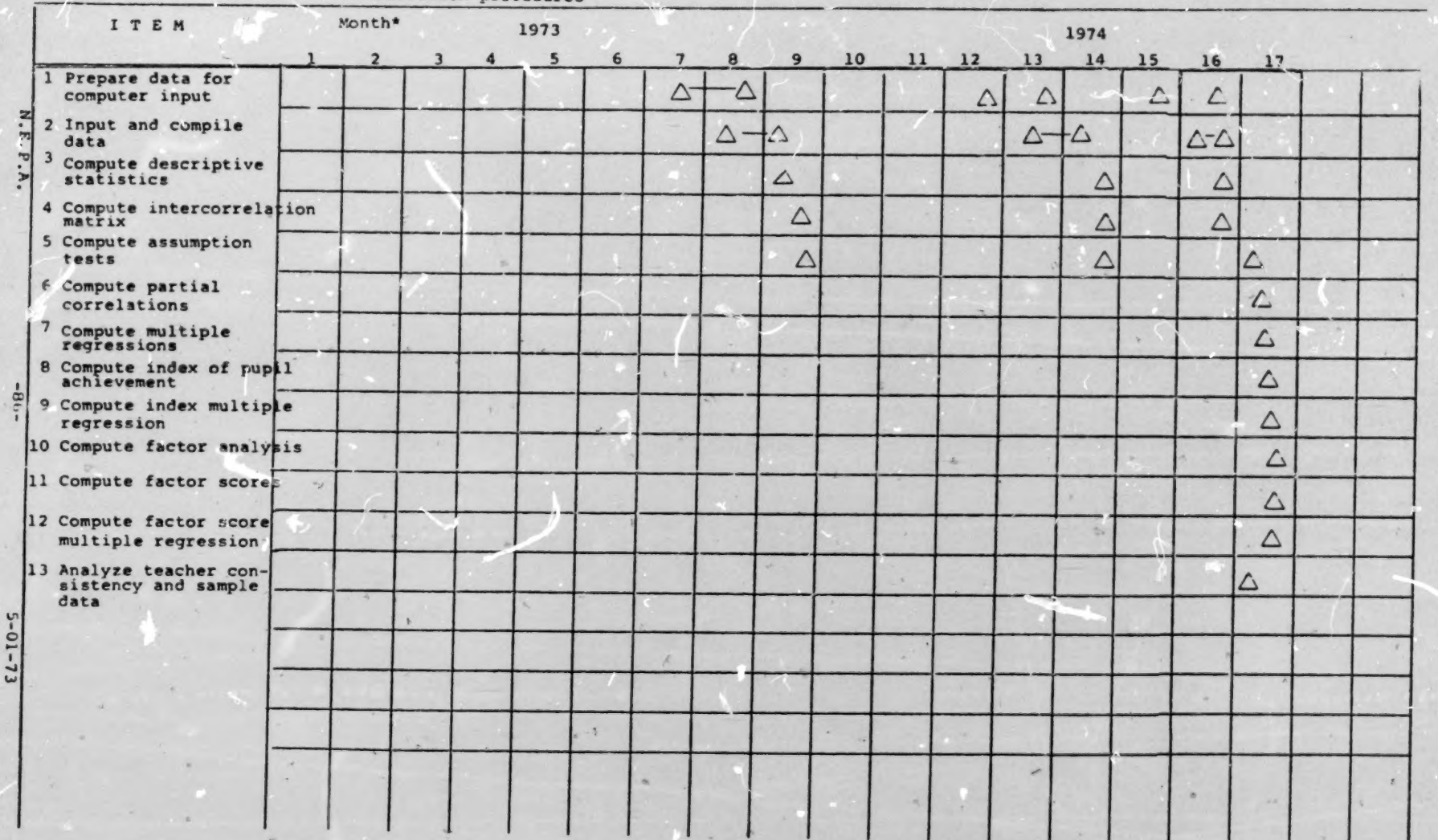


N.E.P.A.

-85-

5-10-73

N - Analyze data from all data collection procedures


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Prepare data for computer input
2 Input and compile data
3 Compute descriptive statistics
4 Compute intercorrelation matrix
5 Compute assumption tests
6 Compute partial correlations
7 Compute multiple regressions
8 Compute index of pupil achievement
9 Compute index multiple regression
10 Compute factor analysis
11 Compute factor scores
12 Compute factor score multiple regression
13 Analyze teacher consistency and sample data

N.F.P.A.

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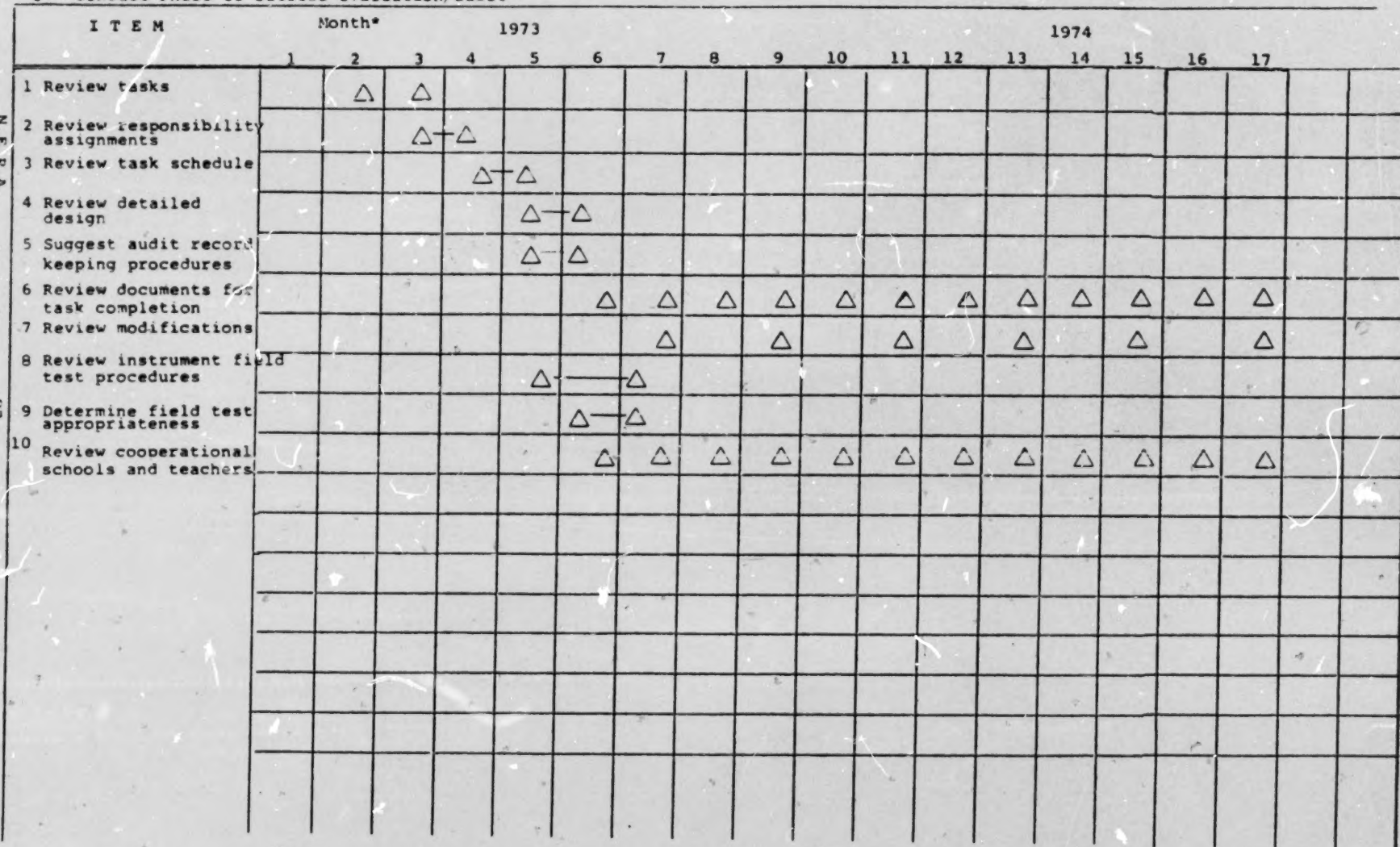
5-01-73

O - Conduct Phase II outside evaluation/audit


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Review tasks
2 Review responsibility assignments
3 Review task schedule
4 Review detailed design
5 Suggest audit record keeping procedures
6 Review documents for task completion
7 Review modifications
8 Review instrument field test procedures
9 Determine field test appropriateness
10 Review cooperational schools and teachers

N.E.P.A.

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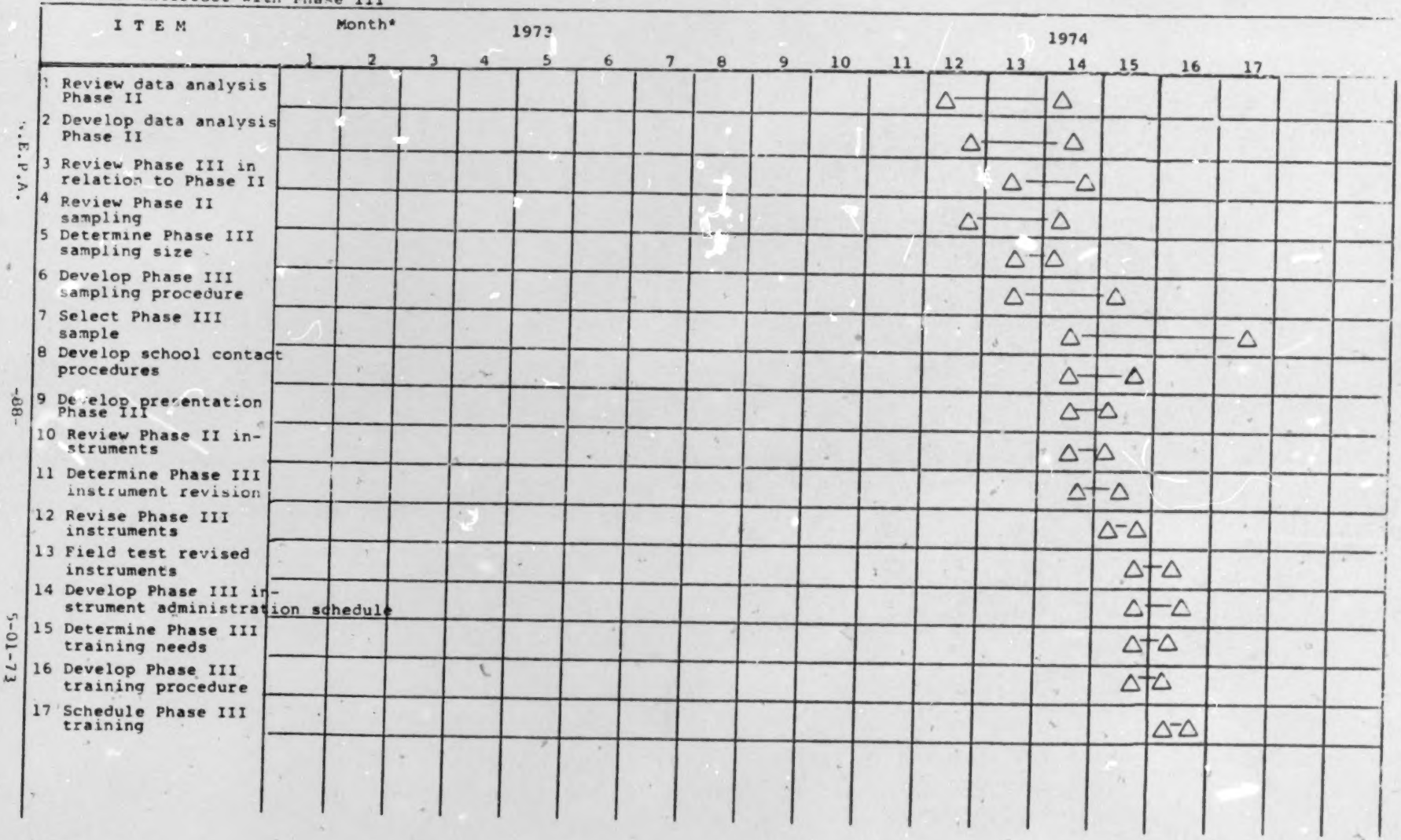
5-01-73

P - Plan interface with Phase III


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
1 Review data analysis Phase II
2 Develop data analysis Phase II
3 Review Phase III in relation to Phase II
4 Review Phase II sampling
5 Determine Phase III sampling size
6 Develop Phase III sampling procedure
7 Select Phase III sample
8 Develop school contact procedures
9 Develop presentation Phase III
10 Review Phase II instruments
11 Determine Phase III instrument revision
12 Revise Phase III instruments
13 Field test revised instruments
14 Develop Phase III instrument administration schedule
15 Determine Phase III training needs
16 Develop Phase III training procedure
17 Schedule Phase III training

P - 2

ITEM	Month* 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	1973													1974			
18 Develop Phase III training materials																	△-△
19 Determine Phase III instrument collection procedures																	△-△
20 Determine Phase III instrument collection procedures																	△-△
21 Determine computer input Phase III																△	△
22 Determine computer analysis schedule Phase III																△	△

N.E.P.A.

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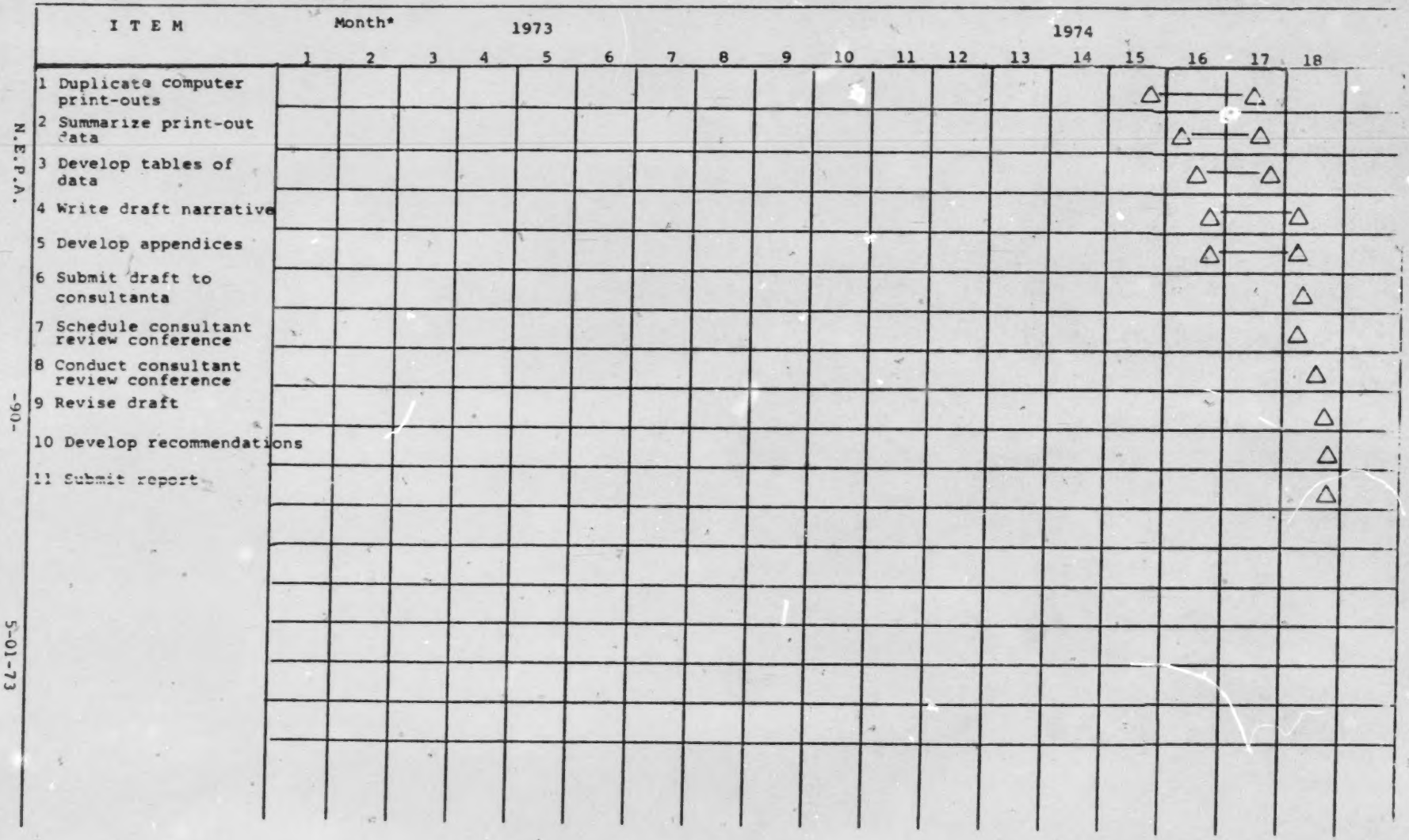
-10-73

Q - Prepare Phase II Technical


ITEM
Month*
1973
1974
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
1 Duplicate computer print-outs
2 Summarize print-out data
3 Develop tables of data
4 Write draft narrative
5 Develop appendices
6 Submit draft to consultanta
7 Schedule consultant review conference
8 Conduct consultant review conference
9 Revise draft
10 Develop recommendations
11 Submit report

N.E.P.A.

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5-01-73

R - Prepare and publish Phase II Summary Report

ITEM	Month* 1973 1	2	3	4	5	6	7	8	9	10	11	12	1974 13	14	15	16	17	18
1. Write report for general readers																	△	△
2 Review report																		△
3 Revise report																		△
4 Print report																		△
5 Identify oral presentation information																	△	△
6 Develop oral presentation format																	△	△
7 Develop oral presentation																		△
8 Develop visuals for oral presentation																		△
9 Review oral presentation																		△
10 Revise oral presentation																		△
11 Identify oral presentation groups																	△	
12 Schedule oral presentations																		△
13 Conduct oral presentations																		△

N.E.P.A.

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5-10-73

BUDGET

The accountability of the Commission for Teacher Preparation and Licensing and/or any contractor(s) shall be in terms of time allocated to the major tasks, not the time allocated to the sub-tasks. The task schedule and budget are prepared for personnel, materials and travel based on the assumption that the Commission performs all tasks or that the Commission contracts with one contractor.

The utilization of a series of sub-contractors will result in increased monetary and time costs in managing the performance of interrelated sub-tasks when performed by different contractors. In addition, the different overhead and profit scales of various contractors will increase the cost of the study if several sub-contractors are involved in performing the various tasks.

PROJECTED TASK BUDGET

A	Analyze results of literature review	$ 16,000
B	Analyze and select existing instruments to measure all variables	17,500
C	Revise existing and develop new instruments for variables as necessary	35,000
D	Develop study data analysis system	17,000
E	Select teacher sample	12,500
F	Orient teachers and identify participants	10,000
G	Develop teacher interview training program	10,000
H	Plan teacher observations and train observers	10,000
I	Collect Phase II initial student and teacher data	28,000
J	Conduct feasibility sub-study	4,000
K	Determine consistency of teacher behavior through analysis of sub-sample data	7,000
L	Conduct video and audio taping	21,000
M	Collect Phase II terminal data	28,000
N	Analyze data from all data collection procedures	40,000
O	Conduct Phase II outside evaluation/audit	17,500
P	Plan interface with Phase III	18,000
Q	Prepare Phase II technical report	14,000
R	Prepare and publish Phase II summary report	15,000
	Total	$342,000

CALIFORNIA TEACHER LICENSING STUDY

Monthly 1973 Task Budget — 1974

TASK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Task Total
A	5,333	5,333	5,334																160.0
B	8,750	8,750																	17500
C		7,000	7,000	7,000	7,000	7,000													35000
D	2,500	2,500	2,500	2,500	2,500	2,500	2,500												17,500
E	2,500	2,500	2,500	2,500	2,500														12,500
F	2,000	2,000	2,000	2,000	2,000														10,000
G		3,333	3,333	3,334															10,000
H	5,000	5,000	5,000	5,000	5,000	5,000													30,000
I				7,000	7,000	7,000	7,000												28,000
J					570	570	570	570	570	570	570	570							4,000
K	1,000				1,000	1,000				1,000	1,000		1,000	1,000					7,000
L					2,100	2,100		2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100				21,000
M												7,000	7,000	7,000	7,000				28,000
N						4,400	4,400	4,400			4,400	4,400	4,400	4,400	4,400	4,800			40,000
O	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	17,500
P												3,000	3,000	3,000	3,000	3,000	3,000		18,000
Q														2,000	3,000	3,000	3,000	3,000	14000
R																8,000	8,000		16,000
Monthly Total	27583	37416	28667	30334	30100	30570	15470	8070	3670	4670	9070	18080	18500	20500	20500	19800	15000	4000	342000

N.E.P.A. -94- 5-01-73

APPENDIX A

Student - Background

Demographic Data

age

sex

race

major or dominant language

major language spoken in the home

income of the family

occupation of the father

occupation of the mother

attendance at kindergarten

number of years retained or grades repeated

number of siblings

birth order

enrollment in special program:

Title I reading
bilingual program
remedial reading

Census-track data

Demographic data form to be developed

Academic ability

Short form test of Academic Attitudes level 1 and 3

Student learning style

Criterion - referenced

Prescriptive Mathematics Inventory

Mathematics - application

National Assessment Project

and/or measures to be develped in conjunction with reading application

Mathematics - attitude

Hoyt Scale for Measuring Arithmetic Attitude

or instrument to be developed based on the Q-sort model developed by George Perry Huff.

Learning style indicator (student form)

Student - Achievement

Reading - cognitive skills - decoding and comprehension

Norm - referenced

California Achievement Test, Levels 1 and 3

Criterion - referenced

Prescriptive Reading Inventory or

Criterion Reading

Reading - application

National Assessment Project

and/or measures to be develped in conjunction with mathematics application, in which the student must demonstrate mastery of reading skills to complete simple mathematics problems and demonstrate mastery of mathematics skills to solve simple reading problems

Reading - attitude

Instrument developed by George Perry Huff, using a Q-sort procedure to assess attitudes

Mathematics concepts and computation

Norm - referenced

California Achievement Test, levels 1 and 3

Teacher - Background

Demographic data

years of experience

degree status

grades in educational courses for certification

in-service training

educational level of father

educational level of mother

major language in the home

major or dominant language

race

Teacher - Behaviors

Verbal fluency

Cornell Critical Thinking Test or

Teacher Performance Appraisal Scale

Quick Word Test

Quantitative ability

Cognitive Abilities Tests

Communications skills

I Control of Communication environment -

Teachers sensitivity to:
- Conditions of the room
- Pre-class attitudes
- Hostile or interferring stimuli

II Teachers Ability to Read Student Feedback
- sensitivity to non-verbal clues
- ability to promote student verbal reactions and interaction

III Non-verbal Teacher Behavior
- supportive mannerisms
- effective eye contact
- ability to use variety of physical movement

IV Teachers Vocal Characteristics
- vocal loseness or tension when it relates to positive image
- vocal variety
- appropriate pitch, tempo, or volume
- ability to be understood based on articulation and enunciation
- any vocal mannerisms which call attention to themselves
- appropriate or affective use of pauses, stress-pitch-volume-tempo-variety-patterns to accent or call attention to ideas

V Teachers Verbal Organizational Skills
- direction or lack of direction
- ability to categorize ideas to promote perception and recall
- ablility to use introductory remarks to gain attention and establish a climate to listen
- effective use of transition
- teacher propensity to stick to the subject or wander
- ability to divide an idea into logical components

VI Teachers Ability to Motivate Students
- ability to use appropriate language
- ability to adapt to the particular communication situation
- appropriate selection of supporting material
- ability to relate concepts to the frame of reference of the students

VII Teachers ability to convey information clearly
- use of repetition
- use of example and illustrations
- use of clear definitions
- use of clear and non-technical language

VIII Teachers ability to use communication aids
- ability to use aid to reinforce context of the message
- ability to select appropriate aid
- ability to make maximum utilization of this aid
- ability to place this aid in an appropriate or meaningful context

IX Ability of teacher to develop personal credibility or ethos
- teachers ability to project himself as being knowledgeable in his field
- teachers ability to identify with the students
- teachers ability to maintain contact
- teachers ability to develop trust
- ability to relate ideas and concepts to those held by the students
- teachers ability to communicate concern for the students
- teachers willingness to show part of himself with the students via example and illustrations used
- teacher ability to convey appropriate emotion and logical approval to inspire students

X Teachers ability to read orally
- teacher ability to select/appraise materials to read
- ability to communicate enthusiasms
- appropriate pacing and timing

- teacher ability to create atmospheres or mood
- ability to use appropriate articulation or vocal quality to correspond to the material being read

XI Teacher ability to conduct discussion
- ability to frame thought-provoking questions
- ability to stimulate involvement by all students
- ability to direct discussion to a desired objective
- ability to summarize and maintain clarity in the discussion
- ability to draw conclusion from the answers received
- ability to use students answer to fashion new questions
- ability to use a student's answers to encourage discussion and controversy among the students
- ability to resolve conflicts created by group interaction
- ability to resolve inter-personal conflicts
- ability to keep students on course and not wander from the points at issue

An observation instrument to be developed based on the communication skills, by the use of a five point rating scale and Flanders System of Interaction Analysis

Diagnosis and Prescription

Teaching Aptitude Test and observational procedures to be developed

Teacher Attitude

Teacher Attitude toward Reading or an instrument to be developed to measure attitude toward arithmetic based on the model developed by George Perry Huff

An instrument to be developed to measure attitudes toward each student, by paired comparison of students and a tabulation of the number of times each student is chosen or Minnesota Teacher Attitude Inventory.

School and District

per pupil expenditure

economic category into which district falls

type of reading program (s)

amount of time spent in reading within the classroom

availability of supplementary materials such as library books

amount of parent involvement in education

amount of time spent in mathematics in the classroom

type of mathematics program (s)

type and extent of in-service programs

type and extent of supervision of teachers

availability of support services; music, art, guidance, counselor, psychologist

availability of special programs; bilingual education, special education, speech therapy, remedial reading

instructional grouping procedures

mobility of teaching staff

mobility of students

instrument to be developed

EXISTING INSTRUMENTS

Short Form Test of Academic Aptitude
CTB/McGraw-Hill
Del Monte Research Park
Monterey, California

Learning Style Indicator, Project Interplay
Brennan Middle School
Attleboro, Mass.

California Achievement Test
CTS/McGraw-Hill
Del Monte Research Park
Monterey, California

Prescriptive Reading Inventory
CTB/McGraw-Hill
Del Monte Research Park
Monterey, California

Criterion Reading
Random House School Division
Random House, Inc.
New York, N. Y.

Reading Attitude
George Perry Huff, Ph.D
3724 Lime Ave.
Long Beach, California 90807

Prescriptive Mathematics Inventory
CTB/McGraw/Hill
Del Monte Research Park
Monterey, California

Hoyt Scale for Measuring Arithmetic Attitude
Ralph G. Anttonen
Western Reserve University
Cleveland, Ohio 44106

Cornell Critical Thinking Test
CTB/McGraw-Hill
Del Monte Research Park
Monterey, California

Teacher Performance Appraisal Scale
William D. Johnson
Office of Student Teaching
276 Education Bldg.
University of Illinois
Urbana, Illinois

Quick Word Test
Harcourt Brace Janovich, Inc. (Out of print)
New York City, N. Y.

Cognitive Abilities Tests
Educational Testing Service
Princeton, New Jersey

Teacher Attitude Toward Reading
George Perry Huff
3724 Lime Avenue
Long Beach, California 90807

Flanders System of Interaction Analysis
Ned A. Flanders
Far West Laboratory for Educational Research and Development
Garden Circle, Claremont Hotel
Berkely, California

Minnesota Teacher Attitude Inventory
Psychological Corporation
304 West 75th Street
New York, New York

APPENDIX B

TABLE I

MEANS AND STANDARD DEVIATIONS

SAMPLE

N=XXXX

Variable	Mean	SD
Reading obtained	xxx.xxx	xx.xx
Reading attitude	xxx.xxx	xxx.xx
Race attitude	.xxx	x.xx
Kindergarten attendance	x.xxx	x.xx

TABLE II

CORRELATION MATRIX

N=XXXX

	Obtained Reading	Anticipated Reading	Race	Kindergarten attendance	Occupation of Father
Obtained Reading	x.xxx				
Reading Attitude	*** .xxx	x.xxx			
Race	*** .xxx	* .xxx	x.xxx		
Kindergarten attendance	*** .xxx	* .xxx	-.xxx	x.xxx	
Occupation of Father	*** .xxx	*** .xxx	** .xxx	.xxx	x.xxx

*P=.05
**P=.01
***P=.001

SAMPLE

TABLE III

REGRESSION EQUATION

N=XXX

Dependent variable	obtained reading score
Multiple R	xxx
R Squared	xxx

Analysis of Variance	Df	Sum of Squares	Mean Square	F
Regression	x	xxxxxx.xxxx	xxxxx.xxxx	xx.xx*
Residual	xxx	xxxxxx.xxxx	xxxx.xxxx	

Variable	B	Beta	Standard Error of B	F
Reading attitude	x.xxxxx	x.xxxx	x.xxxxx	xx.xxx
Teacher years experience	x.xxxxx	x.xxxx	x.xxxxx	xx.xxx
Teacher verbal ability	-xx.xxxxx	-x.xxxxx	x.xxxxx	xx.xxx
Teacher student interaction	x.xxxxx	x.xxxxx	x.xxxxx	x.xxx
Constant	xxx.xxxxx			

* p = .01

SAMPLE

TABLE IV

CONTRIBUTION OF SEVERAL FACTORS TO VARIANCE

N=XXXX

Variables	Percentage of variance accounted for
Teacher variable	.XXX
Student & related variables	.XXX
Teacher background variables	.XXX
School and System variables	.XXX
Total	.XXX

APPENDIX C

STABILITY SUB-STUDY

During the development of the Research Design an additional sub-study was identified to answer questions of the stability of teacher output in terms of student achievement. The sub-study was dropped from the Research Design due to the constraints of the budget. However, it is presented as an appendix to provide for consideration of the procedure in an application for additional funding.

The sub-study will assess the stability of teacher output in terms of student achievement during and prior to Phase II. The procedure will involve the collection of achievement data, specifically score on norm-referenced tests, for students in the classrooms of sample teachers for the previous two years. These data will be analyzed in relation to the measures of teacher behavior obtained during Phase II. All data will be analyzed for the year previous to Phase II. For the data analysis for the second year prior to Phase II, data from the studerts of Beginning Teachers will be excluded from the analysis.

SUPPLEMENTARY BUDGET

Supportive Services to Teachers:

Assuming an average substitute payment of $30.00 and that teachers will be out of classrooms for three days to participate in Phase II, 144 substitutes at $30.00/day for six (6) days = $25,920.00.

Honorarium of $100 for participating teachers = $14,400.

Total cost of Supportive Services $40,320.00.

SUPPLEMENTARY BUDGET

Stability Sub-Study:

To research records, collect student achievement data and analyze the student achievement data - $10,000.00.